

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED			1b. RESTRICTIVE MARKINGS		
2a. SECURITY CLASSIFICATION AUTHORITY			3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release: distribution unlimited.		
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE					
4. PERFORMING ORGANIZATION REPORT NUMBER(S)			5. MONITORING ORGANIZATION REPORT NUMBER(S) BRMC-83-5080-II		
6a. NAME OF PERFORMING ORGANIZATION Applied Concepts Corporation		6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION Air Force Business Research Mgt Center AFBRMC/RDCB		
6c. ADDRESS (City, State and ZIP Code) 109K North Main Street Woodstock, VA 22664			7b. ADDRESS (City, State and ZIP Code) Area B, Bldg 125 WPAFB, OH 45433		
8a. NAME OF FUNDING/SPONSORING ORGANIZATION AFBRMC		8b. OFFICE SYMBOL (If applicable) RDCB	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER F33615-83-C-5080		
8c. ADDRESS (City, State and ZIP Code)			10. SOURCE OF FUNDING NOS.		
			PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.
			71113	0	009
11. TITLE (Include Security Classification) Phase II-Robotics Investment Decision Model Users Manual (U)			10. SOURCE OF FUNDING NOS.		
			PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.
			71113	0	009
12. PERSONAL AUTHOR(S) James A. Simpson					
13a. TYPE OF REPORT Users Manual		13b. TIME COVERED FROM 840221 TO 840502		14. DATE OF REPORT (Yr., Mo., Day) 840504	
				15. PAGE COUNT 87	
16. SUPPLEMENTARY NOTATION The views expressed herein are solely those of the researchers and do not represent those of the United States Air Force.					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB GR	Economic analysis, equipment, aerospace industries, robots, concepts, production, materiel, computer models.		
14	01				
19. ABSTRACT (Continue on reverse if necessary and identify by block number) This report describes how to use the Robotics Investment Decision Model (RIDM). RIDM is a computerized model for assessing the economic attractiveness of investments in robotics and/or flexible manufacturing systems. It is written as a template for Lotus 1-2-3, a popular microcomputer-based electronic spreadsheet program. RIDM models the nominal and discounted cash flows generated by the investment as compared to the existing method of manufacture, and provides the internal rate of return and net present value of the investment, both before and after taxes.					
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT UNCLASSIFIED/UNLIMITED ☒ SAME AS RPT. ☐ DTIC USERS ☐			21. ABSTRACT SECURITY CLASSIFICATION Unclassified		
22a. NAME OF RESPONSIBLE INDIVIDUAL Lt. Joseph S. Peck			22b. TELEPHONE NUMBER (Include Area Code) (513)255-6221		22c. OFFICE SYMBOL RDCB

EXECUTIVE SUMMARY

This report is the product of Phase II research for a three phase project entitled "Investment Justification of Robotic Technology in Aerospace Manufacturing". The project objective is to develop a uniform, accurate, and supportable economic analysis methodology for robotics investment justification for use by the aerospace industry.

In Phase I (AD-A140782), Applied Concepts Corporation (ACC) surveyed robotics investment decision making methodologies used or proposed by government, industry and academia. The research concluded that the Tech Mod/IMIP computerized discounted cash flow model provided the best opportunity for modifying an existing method to perform economic analyses of robotics investment projects.

In Phase II, ACC first attempted to modify the Tech Mod/IMIP model, but found it to be tailored to its specific objective that is, the assessment of Tech Mod/IMIP programs, to a greater extent than previously thought. ACC next developed a new model incorporating as many features of the Tech Mod/IMIP model as was practical. This model is called the Robotics Investment Decision Model or RIDM and can be used industry-wide for assessing the economic attractiveness of investments in robotics.

In Phase III, ACC will validate the model testing it for accuracy, adequacy, and ease of use.

ADA 175467

BRMC-83-5080-II

PHASE II - ROBOTICS INVESTMENT DECISION MODEL (RIDM) USERS MANUAL

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May 1984

Final Report for Period Covering February - May 1984
Contract No. F33615-83-C-5080

Prepared for
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Approved for Public Release:
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TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
EXECUTIVE SUMMARY	i
I. INTRODUCTION	1
II. PROGRAM DESCRIPTION	4
III. OPERATING INSTRUCTIONS	7
IV. APPENDICES	
Appendix A Sample RIDM Application	12
Appendix B Program Listing	21
Appendix C Test Plan	81

I. INTRODUCTION

1. The robotics investment decision model (RIDM) is a tool designed for assessing the economic attractiveness of investments in robotics and/or flexible manufacturing systems (FMS). It models the cash flows generated by such an investment, as compared to the existing method of manufacture. Required inputs are the costs under both the robotic/FMS approach and the old method. Additional inputs are required if the user exercises the option in the model to consider changes in work station throughput and/or differences in value added at the work station. Model outputs are nominal cash flow, discounted cash flow, internal rate of return, and net present value of the investment at the user-specified discount rate. Before-tax and after-tax analyses are provided by the model.
2. The model is written as a template for Lotus 1-2-3, one of the popular "electronic spreadsheet" programs. The model was developed on the Zenith Z-100 version of Lotus 1-2-3, Release 1A, running under Z-DOS/MS-DOS release 1.01, version 1.25. To use the model as written, you will need a personal computer which can run Lotus 1-2-3, a disk drive that can read the data diskette on which the model has been installed, and 256 kilobytes of random access memory (RAM). Users with less than 256K RAM can still run the model, but will need to break it into smaller files. The recommended place for the initial break is just before the after-tax analysis section. The model provides for up to a fifteen year analysis period. Users who do not require the entire fifteen year period may eliminate the unnecessary years, thereby reducing memory requirements. A number of additional years may be added to the analysis period without requiring more than 256K RAM.

3. Most IBM PC and IBM-compatible personal computers will be able to run Lotus 1-2-3 and read the RIDM data diskette on which the model is stored. The exact software and memory requirements for using the model will depend upon the versions of Lotus 1-2-3 and DOS that your system uses. Newer versions of DOS (Version 2.0) and Lotus (Release 1A) have more features and require more memory than earlier versions. The preferred RAM availability would remain 256K.

4. Use of the model requires the user to have no more than an intermediate level working knowledge of Lotus 1-2-3. The model's structure and commands have been kept as simple as possible, to facilitate the broadest use throughout industry and to enable the user to modify the model as required to reflect special circumstances of a company or robotic/FMS application. The model contains no Macros or range names, and all cell references are relative.

5. It is important to remember that RIDM assesses the inherent economic attractiveness of robotic/FMS implementation. The model is based upon real economic events, and not upon how those events are accounted for. Thus, for example, the cost of robot hardware is considered to be its purchase price (plus shipping, set up, etc.), plus the interest expense for any funds borrowed to make the purchase. An account-based approach would treat the depreciation expense as the cost. RIDM models the true economic return, both before and after taxes. It does not directly model the impact upon company financial statements, as would an account-based approach. However, RIDM contains all the information necessary for the user to

perform a special "balance sheet" analysis which would show such impacts.

6. RIDM does not address the multitude of special considerations imposed when doing business with the Federal government under cost-based contracts. Primary among these are the impacts of government cost accounting standards (CAS) upon cash flows, and the impact of cost changes upon prices. The Tech Mod/IMIP Model, recently developed by Logistics Management Institute (and sometimes called the LMI Discounted Cash Flow Model), directly addresses these considerations.

II. PROGRAM DESCRIPTION

1. This section presents a short description of the Robotics Investment Decision Model. Step-by-step instructions on how to operate the model are presented in the next section.
2. The program software is written as a Lotus 1-2-3 spreadsheet, with 335 rows and sixteen columns. A basic working knowledge of Lotus 1-2-3 is prerequisite for using the model. All cell references are relative. The model provides a fifteen year analysis period, although it can be modified to allow a shorter or longer period. The first part of the model performs a before-tax analysis, followed by a second part which performs an after-tax analysis. The structure of the model is summarized below:

a. Before Tax Analysis

- 1) Old Method Cost Elements
- 2) New Method Cost Elements
- 3) Cash Flow from Investment
- 4) Production Quantity Adjustment
- 5) Adjustment for Changes in Quality or Value Added

b. After Tax Analysis

- 1) Computation of Depreciation, Investment Tax Credits,
and Tax Savings for Old Method
- 2) Computation of Depreciation, Investment Tax Credits,
and Tax Savings for New Method
- 3) Summary of After Tax Analysis

3. Each section is described below in more detail.

a. Before Tax Analysis

(1) Old Method Cost Elements

This section is for user inputs on the costs of the existing or baseline manufacturing method. The inputs should be in the form of nominal dollars.

(2) New Method Cost Elements

This section is for user inputs on the costs of the new or alternative manufacturing method, that is, the robotic or FMS technology. The inputs should be in the form of nominal dollars.

(3) Cash Flow from Investment

This section is computed by the model. The net cash flow from moving from the old method to the new method is presented for each cost element. The overall net cash flow for each year is also presented.

(4) Production Quantity Adjustment

This section is optional. It adjusts the cash flow estimates to reflect the differences in throughput (output) between the old and new method. The throughput effect's impact on cash flow is computed by considering the cost per unit of production under each method, and determining how much more or less it would cost under the old method to produce the same amount as under the new method.

(5) Adjustment for Changes in Quality or Value Added

This section is optional. It adjusts the cash flows for the difference in value added at the work station per unit of output.

After this section, the model presents a summary of the before-tax analysis. The adjusted annual cash flow, cumulative cash flow, internal rate of

return, and net present value of the investment are computed and displayed. Annual and cumulative discounted cash flows are also presented.

b. After Tax Analysis

(1) Computation of Depreciation, Investment Tax Credits, and Tax Savings for Old Method

This section of the model computes the depreciation, investment tax credits, and the tax savings from depreciation and non-depreciable business costs for the old method. The required input is the investment schedule for each class of depreciable property. A section is provided for an optional analysis of state and local tax impacts, to be custom designed by the user.

(2) Computation of Depreciation, Investment Tax Credits, and Tax Savings for New Method

This section performs the same function as the previous one, but for the new method. It computes the depreciation, investment tax credits, and the tax savings from depreciation and non-depreciable business costs for the new method. The required input is the investment schedule for each class of depreciable property. A section is provided for an optional analysis of state and local tax impacts, to be custom designed by the user.

(3) Summary of After Tax Analysis

This section brings together the results of the previous two sections to compute the annual and cumulative after-tax cash flow, undiscounted rate of return, a discounted cash flow analysis, and a discounted rate of return.

III. OPERATING INSTRUCTIONS

1. Overview

a. The user first inputs the costs under the old method of production for each year to be considered, and then under the robotic/FMS approach. A list of recommended cost elements is provided for guidance. The model then computes nominal cash flows, that is, the differences in costs. The user is then provided the option of considering differences in throughput between the two alternative methods. After this, there is an option for considering differences in value added at the workstation. The model then performs a before-tax analysis, providing undiscounted and discounted cash flows, internal rate of return, and net present value at a user specified discount rate.

b. An after-tax analysis is performed next. The user inputs the investment schedule for depreciable property, by asset class, for both the old and new methods. The model computes and compares between alternatives the investment tax credit and accelerated cost recovery system (ACRS) depreciation for each year, and the federal tax impact upon cash flow. Space is provided for custom-built analysis of state and local income taxes under both old and new methods. The last section is a summary report, providing before tax undiscounted cash flow, and the impact upon cash flow from investment tax credits, depreciation, federal income taxes, and state and local taxes. After tax cash flow is presented by year, as is cumulative cash flow. The after tax internal rate of return is presented, as is the net present value of the investment, per a user-specified discount rate. Lastly, after tax discounted cash flow is presented by year, and cumulatively by year.

2. Detailed Instructions

This section addresses each of the major sections of the model.

a. "OLD METHOD COST ELEMENTS" and "NEW METHOD COST ELEMENTS"

(1) The first and most important step in using the model is to input the costs of the two alternative manufacturing approaches (the old method and the new method). A separate area of the spreadsheet is provided for each alternative. Cost elements important for robotics/FMS applications are provided for guidance. The user may wish to change some of these to reflect company cost tracking and reporting categories, or special aspects of the manufacturing application. The user should feel free to modify the categories as needed, but should be careful that doing so does not lead to double counting. The yearly cost totals should be checked to ensure this.

(2) For cases where a robotic/FMS technology replaces several work stations, the appropriate costs from each of the old method work stations should be summed to yield a cell total for the old method. Lotus 1-2-3 allows the user to perform this on the worksheet, within each cell. Lotus also facilitates extrapolation of costs into the future, since it allows extrapolation formulas to be copied across rows. The analysis may be performed in either nominal or constant dollars.

(3) Where costs for the old method and new method are the same, the cells may be left empty. This will not affect the economic analysis results. It will result in a distortion of the per unit cost under each method, but the per unit cost difference will not be distorted.

b. "CASH FLOW FROM INVESTMENT"

(1) The third area on the spreadsheet presents the cash flows that would result from moving from the old method to the new method of manufacture. The cell formulas are "plus OLD METHOD minus NEW METHOD", except for salvage value which is a revenue generator, and therefore its formula is "plus NEW METHOD minus OLD METHOD". If a cost is higher under the new method than the old, the cash flow is negative. If a cost is lower, the cash flow is positive. For salvage value, the relationship is reversed. The "CASH FLOW FROM INVESTMENT" table shows the cash flows for individual cost elements, and summarizes them for each year in the analysis period.

c. "PRODUCTION QUANTITY ADJUSTMENT (BEFORE TAX)"

(1) This portion of the model provides the user with the option of considering differences in throughput between the old method and new method. The user exercises this option by entering the throughput for each year of the analysis period, for both the old and new method. The model computes for each year the change in throughput, the percentage change in throughput, the change in production cost per unit, the percentage change in production cost per unit, and the cash flow as modified by the throughput effect.

d. "ADJUSTMENT FOR CHANGES IN QUALITY OR VALUE ADDED"

(1) After the quantity adjustment option, the user is provided the option of adjusting the cash flows for differences in value added at the work station. Differences in value added might result from doing more or less work at the workstation under the new method than under the old method, and/or doing the work in such a way as to yield a higher or lower quality finished or intermediate product. For the user to exercise this option, he must enter for

each year the change in value added at the work station, either positive or negative, which will result from the substitution of the new method for the old method of production. This amount can be determined external to the model, or internally by using a formula that references information already on the spreadsheet. For example, change in value added might be entered as a percentage of production cost per unit, referencing this cell in the previous section.

(2) After the section for the value added adjustment, the model presents the impact of the value added upon cash flow for each year, the new annual cash flow, and, in order to indicate the breakeven period, cumulative cash flow for each year in the analysis period. The internal rate of return is presented next, along with the net present value of the investment. The discount rate for this last computation is entered by the user. The default value for the discount rate is 20%. Annual and cumulative discounted cash flows are also presented.

e. "AFTER TAX ANALYSIS", "COMPUTATION OF DEPRECIATION AND INVESTMENT TAX CREDITS"

(1) In this section, the user first inputs the investment schedule for depreciable property, under both the old and new methods. The user inputs the company's investment in each ACRS class of property (3 year, 5 year, 10 year, and 15 year) for each year of the analysis period. The model computes the investment tax credit, the allowable depreciation for each year, and the resulting tax savings. The only limitation in the depreciation section is that the model assumes all investment in 15 year property (real property) is made within the first three years of the project's life. Space has been left in the spreadsheet, under both the old and new methods, for the user to perform, at his

option, a custom analysis of state and local income tax impacts.

f. "SUMMARY OF AFTER TAX ANALYSIS"

(1) This is the last section of the model. It presents a summary of the analysis results and contains the information for comparing the economic attractiveness of the two alternatives, and for selecting the preferred option. It presents for each year of the analysis period the before-tax undiscounted cash flow, and the impact upon this cash flow of each of the tax impacts. The undiscounted, after tax rate of return is computed as is the net present value of the investment at the user-specified discount rate.

(2) The model then computes the annual and cumulative discounted after tax cash flows, and the discounted after tax rate of return.

Appendix A
Sample RIDM Application

ROBOTICS/FMS INVESTMENT
DECISION MODEL
Illatus 1-2-3 PLANETARY

OLD METHOD COST ELEMENTS	OLD METHOD YEAR 1	OLD METHOD YEAR 2	OLD METHOD YEAR 3	OLD METHOD YEAR 4	OLD METHOD YEAR 5	OLD METHOD YEAR 6	OLD METHOD YEAR 7	OLD METHOD YEAR 8	OLD METHOD YEAR 9	OLD METHOD YEAR 10	OLD METHOD YEAR 11	OLD METHOD YEAR 12	OLD METHOD YEAR 13	OLD METHOD YEAR 14	OLD METHOD YEAR 15
Equipment Purchase															
Equip. Ship. & Install.															
Special Tooling															
Fixtures															
Programming															
Supplies & Material															
Equipment Maintenance	1500	1450	1815	1997	2194	2416	2657	2923	3215	3537	3891	4280	4708	5178	5696
Equipment Repair	5000	5500	6050	6655	7321	8053	8859	9744	10718	11799	12969	14266	15692	17261	18987
Equipment Overhaul			10000					12000					15000		
Facilities Modifications															
Manufacturing Labor	75000	81000	87480	94478	102037	110700	119916	128537	138820	149925	161919	174873	188863	203972	220299
Engineering Labor	1000	1000	1166	1260	1360	1469	1587	1714	1851	1999	2159	2332	2518	2720	2937
Production Control	5500	5400	5832	6299	6802	7347	7934	8569	9255	9995	10795	11658	12591	13599	14686
Shop Supervision															
Material Handling															
Inspection															
Training															
Inventory Costs	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000
Scrap & Rework	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000
Floor Space Costs															
Other MFG. Overhead Costs															
Engineering Overhead															
Administrative Costs															
Property Taxes															
Utilities															
Interest (Cost of borrowed \$)															
Other Expenses															
Equipment Salvage Value															
TOTAL COST, OLD METHOD	\$112,500.00	\$119,620.00	\$137,343.40	\$135,688.17	\$144,716.26	\$154,493.87	\$165,051.97	\$188,496.43	\$188,858.67	\$202,246.03	\$216,732.25	\$232,408.02	\$264,371.56	\$287,729.28	\$287,596.42

NEW METHOD COST ELEMENTS	NEW METHOD YEAR 1	NEW METHOD YEAR 2	NEW METHOD YEAR 3	NEW METHOD YEAR 4	NEW METHOD YEAR 5	NEW METHOD YEAR 6	NEW METHOD YEAR 7	NEW METHOD YEAR 8	NEW METHOD YEAR 9	NEW METHOD YEAR 10	NEW METHOD YEAR 11	NEW METHOD YEAR 12	NEW METHOD YEAR 13	NEW METHOD YEAR 14	NEW METHOD YEAR 15
Equipment Purchase	35000														
Equip. Ship. & Install.	5000														
Special Tooling	7000														
Fixtures	1000														
Programming	3000														
Supplies & Material															
Equipment Maintenance	1000	1000	1750	2650	3993	4392	4832	5315	5846	6431	7074	7781	8559	9415	10257
Equipment Repair	5000	7000	1750	2650	3993	4392	4832	5315	5846	6431	7074	7781	8559	9415	10257
Equipment Overhaul															
Facilities Modifications	15000														
Manufacturing Labor	20000	21600	23328	25194	27210	29387	31737	34276	37019	39980	43176	46613	50363	54432	58944
Engineering Labor	2500	2700	2916	3149	3401	3673	3967	4285	4627	4999	5399	5829	6295	6799	7343
Production Control	1000	1080	1166	1260	1360	1469	1587	1714	1851	1999	2159	2332	2518	2720	2937
Shop Supervision															
Material Handling															
Inspection															
Training															
Inventory Costs	3000	3150	3308	3473	3647	3829	4020	4221	4432	4654	4887	5131	5389	5657	5940
Scrap & Rework	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
Floor Space Costs															
Other Mfg. Overhead Costs															
Engineering Overhead															
Administrative Costs															
Property Taxes															
Utilities															
Interest (Cost of borrowed \$)															
Other Expenses															
Equipment Salvage Value	5000														
TOTAL COST, NEW METHOD	\$519,500.00	\$571,520.00	\$620,517.50	\$670,576.11	\$724,674.01	\$780,147.65	\$838,974.89	\$898,125.54	\$960,621.53	\$1,027,492.13	\$1,097,769.11	\$1,178,486.79	\$1,264,683.27	\$1,358,398.68	\$1,459,677.47

CASH FLOW FROM INVESTMENT

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15
Equipment Purchase	-350000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Equip. Ship. & Install.	-50000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Special Tooling	-70000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fixtures	-10000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Programming	-30000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Supplies & Material	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Equipment Maintenance	-8500	-1350	1495	-1634	-1797	-1977	-2174	-2392	-2631	-2894	-3183	-3502	-3852	-4237	-4661
Equipment Repair	0	2500	2750	3025	3328	3660	4026	4429	4872	5359	5895	6494	7133	7846	8631
Equipment Overhaul	0	0	10000	0	0	0	0	12000	0	0	0	0	15000	0	0
Facilities Modifications	-15000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Manufacturing Labor	55000	59400	64152	69284	74827	80813	87278	94260	101801	109945	118741	128240	138499	149579	161546
Engineering Labor	-1500	-1620	-1750	-1890	-2041	-2204	-2380	-2571	-2776	-2999	-3238	-3497	-3777	-4079	-4406
Production Control	4000	4320	4664	5039	5442	5877	6347	6855	7404	7996	8636	9327	10073	10878	11749
Shop Supervision	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Material Handling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Inspection	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Training	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Inventory Costs	7800	6850	6693	6527	6353	6171	5989	5779	5568	5346	5113	4869	4612	4343	4060
Scrap & Rework	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000
Floor Space Costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Mfg. Overhead Costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Engineering Overhead	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Administrative Costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Property Taxes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Utilities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest (Cost of Borrowed \$)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Equipment Salvage Value	50000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Net Cash Flow (MCF)	(1407,000.00)	192,100.00	197,075.50	192,352.07	199,112.25	1104,341.23	1111,077.07	1130,360.89	-1126,237.15	1124,753.91	1142,963.14	1153,921.03	1179,698.30	1220,320.61	1189,918.95

PRODUCTION QUANTITY ADJUSTMENT
(BEFORE TAX)

PRODUCTION QUANTITY, OLD METHOD	OLD METHOD YEAR 1	OLD METHOD YEAR 2	OLD METHOD YEAR 3	OLD METHOD YEAR 4	OLD METHOD YEAR 5	OLD METHOD YEAR 6	OLD METHOD YEAR 7	OLD METHOD YEAR 8	OLD METHOD YEAR 9	OLD METHOD YEAR 10	OLD METHOD YEAR 11	OLD METHOD YEAR 12	OLD METHOD YEAR 13	OLD METHOD YEAR 14	OLD METHOD YEAR 15
GROSS ANNUAL THROUGHPUT (SAT)	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
ITEM A ITEM B ITEM C															
AVERAGE COST PER UNIT (CPU)	\$112.50	\$119.63	\$137.34	\$135.69	\$144.72	\$154.48	\$165.05	\$178.49	\$188.86	\$202.25	\$216.73	\$232.41	\$264.37	\$267.73	\$287.60
PRODUCTION QUANTITY, NEW METHOD	NEW METHOD YEAR 1	NEW METHOD YEAR 2	NEW METHOD YEAR 3	NEW METHOD YEAR 4	NEW METHOD YEAR 5	NEW METHOD YEAR 6	NEW METHOD YEAR 7	NEW METHOD YEAR 8	NEW METHOD YEAR 9	NEW METHOD YEAR 10	NEW METHOD YEAR 11	NEW METHOD YEAR 12	NEW METHOD YEAR 13	NEW METHOD YEAR 14	NEW METHOD YEAR 15
GROSS ANNUAL THROUGHPUT (SAT)	300	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
ITEM A ITEM B ITEM C															
AVERAGE COST PER UNIT (CPU)	\$1,731.67	\$30.02	\$32.25	\$38.67	\$37.28	\$40.11	\$43.18	\$46.50	\$50.10	\$53.99	\$58.22	\$62.78	\$67.75	\$73.12	\$78.68

PRODUCTION QUANTITY ADJUSTMENT RESULTS
NEW METHOD AS COMPARED TO OLD METHOD

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15
CHANGE IN GROSS THROUGHPUT	-700	250	250	250	250	250	250	250	250	250	250	250	250	250	250
% CHANGE IN GROSS THROUGHPUT	-70.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
CHANGE IN PRODUCTION COST/UNIT	\$1,619.17	(\$89.61)	(\$195.09)	(\$101.02)	(\$107.43)	(\$118.37)	(\$121.87)	(\$141.99)	(\$138.76)	(\$148.25)	(\$158.52)	(\$169.62)	(\$186.62)	(\$194.61)	(\$208.65)
% CHANGE IN PROD COST/UNIT	1839.3%	-74.9%	-76.3%	-74.8%	-78.2%	-78.0%	-73.8%	-75.3%	-75.5%	-73.3%	-73.1%	-73.0%	-74.4%	-72.7%	-72.6%
CASH FLOW AFTER ADJUSTMENT FROM CHANGE IN PROD QUANTITY	(\$485,750.00)	\$112,007.50	\$131,361.35	\$128,278.11	\$134,291.31	\$142,962.21	\$152,349.06	\$177,492.50	\$173,451.81	\$185,315.62	\$199,146.21	\$212,023.03	\$245,781.14	\$243,262.93	\$260,818.06

ADJUSTMENT FOR CHANGES IN
QUALITY OR VALUE ADDED

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15
CHANGE IN VALUE ADDED PER UNIT AT THE WORK STATION UNDER NEW METHOD	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
CASH FLOW IMPACT OF VAL ADDED	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
CASH FLOW, VAL ADDED ADJUSTED	(6485,750.9)	9112,097.5	9131,361.4	9126,279.1	9134,291.3	9142,962.2	9152,340.1	9177,482.5	9173,451.8	9185,315.4	9198,146.2	9212,023.0	9245,781.2	9271,262.9	9260,818.1
CUM CASH FLOW, VAL ADD ADJUSTED	(6485,750.9)	(6373,742.5)	(6242,381.2)	(6116,107.0)	(618,184.3)	(616,146.5)	(313,456.5)	9490,969.0	9664,420.9	9849,736.3	91,047,882.5	91,259,905.5	91,505,686.7	91,798,949.6	92,009,767.7

INTERNAL RATE OF RETURN 9.29
DISCOUNT RATE = 9.29
NPV OF INVESTMENT \$168,385.78

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15
DISCOUNTED CASH FLOW (CONTINUOUS DISCOUNTING)	(6397,179.48)	875,090.87	972,092.64	956,738.61	949,403.01	943,059.39	937,566.60	935,833.10	928,671.39	925,079.71	921,955.23	919,234.30	918,255.05	914,792.03	912,985.37
DISCOUNTED CUM. CASH FLOW	(6397,179.48)	(6222,817.59)	(6250,524.95)	(6193,786.34)	(6144,383.33)	(6101,323.94)	(6063,757.34)	(6027,924.24)	5947.15	925,826.86	947,782.09	967,016.39	985,271.43	9199,964.27	9113,049.63

AFTER TAX ANALYSIS

COMPUTATION OF DEPRECIATION, INVESTMENT TAX CREDITS, & TAX SAVINGS

INVESTMENT IN DEPRECIABLE ASSETS	OLD METHOD YEAR 1	OLD METHOD YEAR 2	OLD METHOD YEAR 3	OLD METHOD YEAR 4	OLD METHOD YEAR 5	OLD METHOD YEAR 6	OLD METHOD YEAR 7	OLD METHOD YEAR 8	OLD METHOD YEAR 9	OLD METHOD YEAR 10	OLD METHOD YEAR 11	OLD METHOD YEAR 12	OLD METHOD YEAR 13	OLD METHOD YEAR 14	OLD METHOD YEAR 15
3 Yr Property (Spec. Tooling)															
5 Yr Property (Mach. Equip.)															
10 Yr Property															
15 Yr Property (Facilities)															
TOT DEPRECIABLE INVESTMENT	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
COMPUTE FED INVEST TAX CREDITS:															
3 Yr Property	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 Yr Property	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 Yr Property	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 Yr Property	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOT FED INVESTMENT TAX CREDIT	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
DEPRECIATION 1ST YR BASIS															
3 Yr Property	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 Yr Property	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 Yr Property	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 Yr Property	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPUTE ANNUAL DEPRECIATION:															
3 Yr Property	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 Yr Property	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 Yr Property	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 Yr Property	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNUAL DEPRECIATION	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
FED TAX SAVINGS FROM DEPREC.	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
FED TAX SAVINGS FROM NON-DEPRECIABLE BUSINESS COSTS	\$15,525.00	\$68,787.25	\$19,472.46	\$78,020.70	\$83,211.25	\$88,818.24	\$94,904.89	\$100,379.70	\$106,393.74	\$116,291.47	\$124,671.04	\$133,634.81	\$152,013.65	\$164,444.34	\$165,387.44
	OLD METHOD YEAR 1	OLD METHOD YEAR 2	OLD METHOD YEAR 3	OLD METHOD YEAR 4	OLD METHOD YEAR 5	OLD METHOD YEAR 6	OLD METHOD YEAR 7	OLD METHOD YEAR 8	OLD METHOD YEAR 9	OLD METHOD YEAR 10	OLD METHOD YEAR 11	OLD METHOD YEAR 12	OLD METHOD YEAR 13	OLD METHOD YEAR 14	OLD METHOD YEAR 15

STATE & LOCAL INCOME TAXES

INVESTMENT IN DEPRECIABLE ASSETS	NEW METHOD YEAR 1	NEW METHOD YEAR 2	NEW METHOD YEAR 3	NEW METHOD YEAR 4	NEW METHOD YEAR 5	NEW METHOD YEAR 6	NEW METHOD YEAR 7	NEW METHOD YEAR 8	NEW METHOD YEAR 9	NEW METHOD YEAR 10	NEW METHOD YEAR 11	NEW METHOD YEAR 12	NEW METHOD YEAR 13	NEW METHOD YEAR 14	NEW METHOD YEAR 15
3 Yr Property (Spec. Tooling)	70000														
5 Yr Property (Inst. Equip.)	340000														
10 Yr Property															
15 Yr Property (Facilities)	15000														
TOT DEPRECIABLE INVESTMENT	\$445,000.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
COMPUTE FED INVEST TAX CREDITS:															
3 Yr Property	4200	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 Yr Property	36000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 Yr Property	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 Yr Property	1500	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOT FED INVESTMENT TAX CREDIT	\$41,700.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
DEPRECIATION 1ST YR BASIS															
3 Yr Property	67900	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 Yr Property	342000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 Yr Property	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 Yr Property	14250	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPUTE ANNUAL DEPRECIATIONS:															
3 Yr Property	16975	25802	25123	0	0	0	0	0	0	0	0	0	0	0	0
5 Yr Property	51300	75240	71820	71820	71820	0	0	0	0	0	0	0	0	0	0
10 Yr Property	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 Yr Property	1710	1425	1203	1140	998	855	855	855	855	713	713	713	713	713	713
ANNUAL DEPRECIATION	\$69,985.00	\$102,467.00	\$98,225.50	\$72,960.00	\$72,817.50	\$855.00	\$855.00	\$855.00	\$855.00	\$712.50	\$712.50	\$712.50	\$712.50	\$712.50	\$712.50
FED TAX SAVINGS FROM DEPREC.	\$37,193.10	\$47,134.82	\$45,183.73	\$37,361.60	\$37,496.05	\$393.30	\$393.30	\$393.30	\$393.30	\$327.75	\$327.75	\$327.75	\$327.75	\$327.75	\$327.75
FED TAX SAVINGS FROM NON-DEPRECIABLE BUSINESS COSTS	\$34,270.00	\$17,263.80	\$18,546.23	\$19,974.61	\$21,437.84	\$23,765.62	\$24,828.45	\$26,737.75	\$28,805.00	\$31,046.38	\$33,473.79	\$36,104.02	\$38,954.30	\$42,045.19	\$45,381.64
	NEW METHOD YEAR 1	NEW METHOD YEAR 2	NEW METHOD YEAR 3	NEW METHOD YEAR 4	NEW METHOD YEAR 5	NEW METHOD YEAR 6	NEW METHOD YEAR 7	NEW METHOD YEAR 8	NEW METHOD YEAR 9	NEW METHOD YEAR 10	NEW METHOD YEAR 11	NEW METHOD YEAR 12	NEW METHOD YEAR 13	NEW METHOD YEAR 14	NEW METHOD YEAR 15

STATE & LOCAL INCOME TAXES

Appendix B
Program Listing

A1: 'ROBOTICS/FMS INVESTMENT
 A2: 'DECISION MODEL
 A3: '(Lotus 1-2-3 FLN:RIDM)
 A8: 'OLD METHOD
 B8: "OLD METHOD
 C8: "OLD METHOD
 D8: "OLD METHOD
 E8: "OLD METHOD
 F8: "OLD METHOD
 A9: 'COST ELEMENTS
 B9: "YEAR 1
 C9: "YEAR 2
 D9: "YEAR 3
 E9: "YEAR 4
 F9: "YEAR 5
 A11: 'Equipment Purchase
 A12: 'Equip. Ship. & Install.
 A13: 'Special Tooling
 A14: 'Fixtures
 A15: 'Programming
 A16: 'Supplied & Material
 A17: 'Equipment Maintenance
 A18: 'Equipment Repair
 A19: 'Equipment Overhaul
 A20: 'Facilities Modifications
 A21: 'Manufacturing Labor
 A22: 'Engineering Labor
 A23: 'Production Control
 A24: 'Shop Supervision
 A25: 'Material Handling
 A26: 'Inspection
 A27: 'Training
 A28: 'Inventory Costs
 A29: 'Scrap & Rework
 A30: 'Floor Space Costs
 A31: 'Other MFG. Overhead Costs
 A32: 'Engineering Overhead
 A33: 'Administrative Costs
 A34: 'Property Taxes
 A35: 'Utilities
 A36: 'Interest (Cost of borrowed \$)
 A37: 'Other Expenses
 A39: 'Equipment Salvage Value
 A41: 'TOTAL COST, OLD METHOD
 B41: (C2) @SUM(B37..B11)-B39
 C41: (C2) @SUM(C37..C11)-C39
 D41: (C2) @SUM(D37..D11)-D39
 E41: (C2) @SUM(E37..E11)-E39
 F41: (C2) @SUM(F37..F11)-F39

A43: / - - - - -
B43: / - - - - -
C43: / - - - - -
D43: / - - - - -
E43: / - - - - -
F43: / - - - - -
A45: 'NEW METHOD
B45: "NEW METHOD
C45: "NEW METHOD
D45: "NEW METHOD
E45: "NEW METHOD
F45: "NEW METHOD

```

A1: 'ROBOTICS/FMS INVESTMENT
A2: 'DECISION MODEL
A3: '(Lotus 1-2-3 FLN:RIDM)
A8: 'OLD METHOD
B8: "OLD METHOD
C8: "OLD METHOD
D8: "OLD METHOD
E8: "OLD METHOD
F8: "OLD METHOD
A9: 'COST ELEMENTS
D9: "YEAR 1
C9: "YEAR 2
D9: "YEAR 3
E9: "YEAR 4
F9: "YEAR 5
A11: 'Equipment Purchase
A12: 'Equip. Ship. & Install.
A13: 'Special Tooling
A14: 'Fixtures
A15: 'Programming
A16: 'Supplied & Material
A17: 'Equipment Maintenance
A18: 'Equipment Repair
A19: 'Equipment Overhaul
A20: 'Facilities Modifications
A21: 'Manufacturing Labor
A22: 'Engineering Labor
A23: 'Production Control
A24: 'Shop Supervision
A25: 'Material Handling
A26: 'Inspection
A27: 'Training
A28: 'Inventory Costs
A29: 'Scrap & Rework
A30: 'Floor Space Costs
A31: 'Other MFG. Overhead Costs
A32: 'Engineering Overhead
A33: 'Administrative Costs
A34: 'Property Taxes
A35: 'Utilities
A36: 'Interest (Cost of borrowed $)
A37: 'Other Expenses
A39: 'Equipment Salvage Value
A41: 'TOTAL COST, OLD METHOD
B41: (C2) @SUM(B37..B11)-B39
C41: (C2) @SUM(C37..C11)-C39
D41: (C2) @SUM(D37..D11)-D39
E41: (C2) @SUM(E37..E11)-E39
F41: (C2) @SUM(F37..F11)-F39
A43: ' - - - - -
B43: ' - - - - -
C43: ' - - - - -
D43: ' - - - - -
E43: ' - - - - -
F43: ' - - - - -
A45: 'NEW METHOD
B45: "NEW METHOD
C45: "NEW METHOD
D45: "NEW METHOD
E45: "NEW METHOD
F45: "NEW METHOD

```

G45: "NEW METHOD
 H45: "NEW METHOD
 I45: "NEW METHOD
 J45: "NEW METHOD
 K45: "NEW METHOD
 L45: "NEW METHOD
 M45: "NEW METHOD
 N45: "NEW METHOD
 O45: "NEW METHOD
 P45: "NEW METHOD
 A46: 'COST ELEMENTS
 B46: "YEAR 1
 C46: "YEAR 2
 D46: "YEAR 3
 E46: "YEAR 4
 F46: "YEAR 5
 G46: "YEAR 6
 H46: "YEAR 7
 I46: "YEAR 8
 J46: "YEAR 9
 K46: "YEAR 10
 L46: "YEAR 11
 M46: "YEAR 12
 N46: "YEAR 13
 O46: "YEAR 14
 P46: "YEAR 15
 A48: 'Equipment Purchase
 A49: 'Equip. Ship. & Install.
 A50: 'Special Tooling
 A51: 'Fixtures
 A52: 'Programming
 A53: 'Supplied & Material
 A54: 'Equipment Maintenance
 A55: 'Equipment Repair
 A56: 'Equipment Overhaul
 A57: 'Facilities Modifications
 A58: 'Manufacturing Labor
 A59: 'Engineering Labor
 A60: 'Production Control
 A61: 'Shop Supervision
 A62: 'Material Handling
 A63: 'Inspection
 A64: 'Training
 A65: 'Inventory Costs
 A66: 'Scrap & Rework
 A67: 'Floor Space Costs
 A68: 'Other MFG. Overhead Costs
 A69: 'Engineering Overhead
 A70: 'Administrative Costs
 A71: 'Property Taxes

A72: Utilities
 A73: Interest (Cost of borrowed \$)
 A74: Other Expenses
 A76: Equipment Salvage Value
 A78: TOTAL COST, NEW METHOD
 B78: (C2) @SUM(B74..B48)-B76
 C78: (C2) @SUM(C74..C48)-C76
 D78: (C2) @SUM(D74..D48)-D76
 E78: (C2) @SUM(E74..E48)-E76
 F78: (C2) @SUM(F74..F48)-F76
 G78: (C2) @SUM(G74..G48)-G76
 H78: (C2) @SUM(H74..H48)-H76
 I78: (C2) @SUM(I74..I48)-I76
 J78: (C2) @SUM(J74..J48)-J76
 K78: (C2) @SUM(K74..K48)-K76
 L78: (C2) @SUM(L74..L48)-L76
 M78: (C2) @SUM(M74..M48)-M76
 N78: (C2) @SUM(N74..N48)-N76
 O78: (C2) @SUM(O74..O48)-O76
 P78: (C2) @SUM(P74..P48)-P76
 A80: \-
 B80: \-
 C80: \-
 D80: \-
 E80: \-
 F80: \-
 G80: \-
 H80: \-
 I80: \-
 J80: \-
 K80: \-
 L80: \-
 M80: \-
 N80: \-
 O80: \-
 P80: \-
 A81: CASH FLOW FROM INVESTMENT
 B83: "YEAR 1
 C83: "YEAR 2
 D83: "YEAR 3
 E83: "YEAR 4
 F83: "YEAR 5
 G83: "YEAR 6
 H83: "YEAR 7
 I83: "YEAR 8
 J83: "YEAR 9
 K83: "YEAR 10
 L83: "YEAR 11
 M83: "YEAR 12
 N83: "YEAR 13

O83: "YEAR 14
 P83: "YEAR 15
 A85: 'Equipment Purchase
 B85: +B11-B48
 C85: +C11-C48
 D85: +D11-D48
 E85: +E11-E48
 F85: +F11-F48
 G85: +G11-G48
 H85: +H11-H48
 I85: +I11-I48
 J85: +J11-J48
 K85: +K11-K48
 L85: +L11-L48
 M85: +M11-M48
 N85: +N11-N48
 O85: +O11-O48
 P85: +P11-P48
 A86: 'Equip. Ship. & Install.
 B86: +B12-B49
 C86: +C12-C49
 D86: +D12-D49
 E86: +E12-E49
 F86: +F12-F49
 G86: +G12-G49
 H86: +H12-H49
 I86: +I12-I49
 J86: +J12-J49
 K86: +K12-K49
 L86: +L12-L49
 M86: +M12-M49
 N86: +N12-N49
 O86: +O12-O49
 P86: +P12-P49
 A87: 'Special Tooling
 B87: +B13-B50
 C87: +C13-C50
 D87: +D13-D50
 E87: +E13-E50
 F87: +F13-F50
 G87: +G13-G50
 H87: +H13-H50
 I87: +I13-I50
 J87: +J13-J50
 K87: +K13-K50
 L87: +L13-L50
 M87: +M13-M50
 N87: +N13-N50
 O87: +O13-O50
 P87: +P13-P50

A88: 'Fixtures

B88: +B14-B51

C88: +C14-C51

D88: +D14-D51

E88: +E14-E51

F88: +F14-F51

G88: +G14-G51

H88: +H14-H51

I88: +I14-I51

J88: +J14-J51

K88: +K14-K51

L88: +L14-L51

M88: +M14-M51

N88: +N14-N51

O88: +O14-O51

P88: +P14-P51

A89: 'Programming

B89: +B15-B52

C89: +C15-C52

D89: +D15-D52

E89: +E15-E52

F89: +F15-F52

G89: +G15-G52

H89: +H15-H52

I89: +I15-I52

J89: +J15-J52

K89: +K15-K52

L89: +L15-L52

M89: +M15-M52

N89: +N15-N52

O89: +O15-O52

P89: +P15-P52

A90: 'Supplied & Material

B90: +B16-B53

C90: +C16-C53

D90: +D16-D53

E90: +E16-E53

F90: +F16-F53

G90: +G16-G53

H90: +H16-H53

I90: +I16-I53

J90: +J16-J53

K90: +K16-K53

L90: +L16-L53

M90: +M16-M53

N90: +N16-N53

O90: +O16-O53

P90: +P16-P53

A91: 'Equipment Maintenance

B91: +B17-B54

C91: +C17-C54
 D91: +D17-D54
 E91: +E17-E54
 F91: +F17-F54
 G91: +G17-G54
 H91: +H17-H54
 I91: +I17-I54
 J91: +J17-J54
 K91: +K17-K54
 L91: +L17-L54
 M91: +M17-M54
 N91: +N17-N54
 O91: +O17-O54
 P91: +P17-P54
 A92: 'Equipment Repair
 B92: +B18-B55
 C92: +C18-C55
 D92: +D18-D55
 E92: +E18-E55
 F92: +F18-F55
 G92: +G18-G55
 H92: +H18-H55
 I92: +I18-I55
 J92: +J18-J55
 K92: +K18-K55
 L92: +L18-L55
 M92: +M18-M55
 N92: +N18-N55
 O92: +O18-O55
 P92: +P18-P55
 A93: 'Equipment Overhaul
 B93: +B19-B56
 C93: +C19-C56
 D93: +D19-D56
 E93: +E19-E56
 F93: +F19-F56
 G93: +G19-G56
 H93: +H19-H56
 I93: +I19-I56
 J93: +J19-J56
 K93: +K19-K56
 L93: +L19-L56
 M93: +M19-M56
 N93: +N19-N56
 O93: +O19-O56
 P93: +P19-P56
 A94: 'Facilities Modifications
 B94: +B20-B57
 C94: +C20-C57
 D94: +D20-D57

E94: +E20-E57
 F94: +F20-F57
 G94: +G20-G57
 H94: +H20-H57
 I94: +I20-I57
 J94: +J20-J57
 K94: +K20-K57
 L94: +L20-L57
 M94: +M20-M57
 N94: +N20-N57
 O94: +O20-O57
 P94: +P20-P57
 A95: Manufacturing Labor
 B95: +B21-B58
 C95: +C21-C58
 D95: +D21-D58
 E95: +E21-E58
 F95: +F21-F58
 G95: +G21-G58
 H95: +H21-H58
 I95: +I21-I58
 J95: +J21-J58
 K95: +K21-K58
 L95: +L21-L58
 M95: +M21-M58
 N95: +N21-N58
 O95: +O21-O58
 P95: +P21-P58
 A96: Engineering Labor
 B96: +B22-B59
 C96: +C22-C59
 D96: +D22-D59
 E96: +E22-E59
 F96: +F22-F59
 G96: +G22-G59
 H96: +H22-H59
 I96: +I22-I59
 J96: +J22-J59
 K96: +K22-K59
 L96: +L22-L59
 M96: +M22-M59
 N96: +N22-N59
 O96: +O22-O59
 P96: +P22-P59
 A97: Production Control
 B97: +B23-B60
 C97: +C23-C60
 D97: +D23-D60
 E97: +E23-E60
 F97: +F23-F60

G97: +G23-G60
 H97: +H23-H60
 I97: +I23-I60
 J97: +J23-J60
 K97: +K23-K60
 L97: +L23-L60
 M97: +M23-M60
 N97: +N23-N60
 O97: +O23-O60
 P97: +P23-P60
 A98: 'Shop Supervision
 B98: +B24-B61
 C98: +C24-C61
 D98: +D24-D61
 E98: +E24-E61
 F98: +F24-F61
 G98: +G24-G61
 H98: +H24-H61
 I98: +I24-I61
 J98: +J24-J61
 K98: +K24-K61
 L98: +L24-L61
 M98: +M24-M61
 N98: +N24-N61
 O98: +O24-O61
 P98: +P24-P61
 A99: 'Material Handling
 B99: +B25-B62
 C99: +C25-C62
 D99: +D25-D62
 E99: +E25-E62
 F99: +F25-F62
 G99: +G25-G62
 H99: +H25-H62
 I99: +I25-I62
 J99: +J25-J62
 K99: +K25-K62
 L99: +L25-L62
 M99: +M25-M62
 N99: +N25-N62
 O99: +O25-O62
 P99: +P25-P62
 A100: 'Inspection
 B100: +B26-B63
 C100: +C26-C63
 D100: +D26-D63
 E100: +E26-E63
 F100: +F26-F63
 G100: +G26-G63
 H100: +H26-H63

I100: +I26-I63
 J100: +J26-J63
 K100: +K26-K63
 L100: +L26-L63
 M100: +M26-M63
 N100: +N26-N63
 O100: +O26-O63
 P100: +P26-P63
 A1: 'ROBOTICS/FMS INVESTMENT
 A2: 'DECISION MODEL
 A3: '(Lotus 1-2-3 FLN:RIDM)
 A5: 'OLD METHOD
 B5: "OLD METHOD
 C5: "OLD METHOD
 D5: "OLD METHOD
 E5: "OLD METHOD
 F5: "OLD METHOD
 G5: "OLD METHOD
 H5: "OLD METHOD
 I5: "OLD METHOD
 J5: "OLD METHOD
 K5: "OLD METHOD
 L5: "OLD METHOD
 M5: "OLD METHOD
 N5: "OLD METHOD
 O5: "OLD METHOD
 P5: "OLD METHOD
 A9: 'COST ELEMENTS
 B9: "YEAR 1
 C9: "YEAR 2
 D9: "YEAR 3
 E9: "YEAR 4
 F9: "YEAR 5
 G9: "YEAR 6
 H9: "YEAR 7
 I9: "YEAR 8
 J9: "YEAR 9
 K9: "YEAR 10
 L9: "YEAR 11
 M9: "YEAR 12
 N9: "YEAR 13
 O9: "YEAR 14
 P9: "YEAR 15
 A11: 'Equipment Purchase
 A12: 'Equip. Ship. & Install.
 A13: 'Special Tooling
 A14: 'Fixtures
 A15: 'Programming
 A16: 'Supplied & Material
 A17: 'Equipment Maintenance

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A18: 'Equipment Repair
A19: 'Equipment Overhaul
A20: 'Facilities Modifications
A21: 'Manufacturing Labor
A22: 'Engineering Labor
A23: 'Production Control
A24: 'Shop Supervision
A25: 'Material Handling
A26: 'Inspection
A27: 'Training
A28: 'Inventory Costs
A29: 'Scrap & Rework
A30: 'Floor Space Costs
A31: 'Other MFG. Overhead Costs
A32: 'Engineering Overhead
A33: 'Administrative Costs
A34: 'Property Taxes
A35: 'Utilities
A36: 'Interest (Cost of borrowed $)
A37: 'Other Expenses
A39: 'Equipment Salvage Value
A41: 'TOTAL COST, OLD METHOD
B41: (C2) @SUM(B37..B11)-B39
C41: (C2) @SUM(C37..C11)-C39
D41: (C2) @SUM(D37..D11)-D39
E41: (C2) @SUM(E37..E11)-E39
F41: (C2) @SUM(F37..F11)-F39
G41: (C2) @SUM(G37..G11)-G39
H41: (C2) @SUM(H37..H11)-H39
I41: (C2) @SUM(I37..I11)-I39
J41: (C2) @SUM(J37..J11)-J39
K41: (C2) @SUM(K37..K11)-K39
L41: (C2) @SUM(L37..L11)-L39
M41: (C2) @SUM(M37..M11)-M39
N41: (C2) @SUM(N37..N11)-N39
O41: (C2) @SUM(O37..O11)-O39
P41: (C2) @SUM(P37..P11)-P39
A43: ' - - - - -
B43: ' - - - - -
C43: ' - - - - -
D43: ' - - - - -
E43: ' - - - - -
F43: ' - - - - -
G43: ' - - - - -
H43: ' - - - - -
I43: ' - - - - -
J43: ' - - - - -
K43: ' - - - - -
L43: ' - - - - -
M43: ' - - - - -

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N43: '
 O43: '
 P43: '
 A45: 'NEW METHOD
 B45: "NEW METHOD
 C45: "NEW METHOD
 D45: "NEW METHOD
 E45: "NEW METHOD
 F45: "NEW METHOD
 G45: "NEW METHOD
 H45: "NEW METHOD
 I45: "NEW METHOD
 J45: "NEW METHOD
 K45: "NEW METHOD
 L45: "NEW METHOD
 M45: "NEW METHOD
 N45: "NEW METHOD
 O45: "NEW METHOD
 P45: "NEW METHOD
 A46: 'COST ELEMENTS
 B46: "YEAR 1
 C46: "YEAR 2
 D46: "YEAR 3
 E46: "YEAR 4
 F46: "YEAR 5
 G46: "YEAR 6
 H46: "YEAR 7
 I46: "YEAR 8
 J46: "YEAR 9
 K46: "YEAR 10
 L46: "YEAR 11
 M46: "YEAR 12
 N46: "YEAR 13
 O46: "YEAR 14
 P46: "YEAR 15
 A48: 'Equipment Purchase
 A49: 'Equip. Ship. & Install.
 A50: 'Special Tooling
 A51: 'Fixtures
 A52: 'Programming
 A53: 'Supplied & Material
 A54: 'Equipment Maintenance
 A55: 'Equipment Repair
 A56: 'Equipment Overhaul
 A57: 'Facilities Modifications
 A58: 'Manufacturing Labor
 A59: 'Engineering Labor
 A60: 'Production Control
 A61: 'Shop Supervision
 A62: 'Material Handling

A63: 'Inspection
 A64: 'Training
 A65: 'Inventory Costs
 A66: 'Scrap & Rework
 A67: 'Floor Space Costs
 A68: 'Other MFG. Overhead Costs
 A69: 'Engineering Overhead
 A70: 'Administrative Costs
 A71: 'Property Taxes
 A72: 'Utilities
 A73: 'Interest (Cost of borrowed \$)
 A74: 'Other Expenses
 A76: 'Equipment Salvage Value
 A78: 'TOTAL COST, NEW METHOD
 B78: (C2) @SUM(B74..B48)-B76
 C78: (C2) @SUM(C74..C48)-C76
 D78: (C2) @SUM(D74..D48)-D76
 E78: (C2) @SUM(E74..E48)-E76
 F78: (C2) @SUM(F74..F48)-F76
 G78: (C2) @SUM(G74..G48)-G76
 H78: (C2) @SUM(H74..H48)-H76
 I78: (C2) @SUM(I74..I48)-I76
 J78: (C2) @SUM(J74..J48)-J76
 K78: (C2) @SUM(K74..K48)-K76
 L78: (C2) @SUM(L74..L48)-L76
 M78: (C2) @SUM(M74..M48)-M76
 N78: (C2) @SUM(N74..N48)-N76
 O78: (C2) @SUM(O74..O48)-O76
 P78: (C2) @SUM(P74..P48)-P76
 A80: \-
 B80: \-
 C80: \-
 D80: \-
 E80: \-
 F80: \-
 G80: \-
 H80: \-
 I80: \-
 J80: \-
 K80: \-
 L80: \-
 M80: \-
 N80: \-
 O80: \-
 P80: \-
 A81: 'CASH FLOW FROM INVESTMENT
 B83: "YEAR 1
 C83: "YEAR 2
 D83: "YEAR 3
 E83: "YEAR 4

F83: "YEAR 5
 G83: "YEAR 6
 H83: "YEAR 7
 I83: "YEAR 8
 J83: "YEAR 9
 K83: "YEAR 10
 L83: "YEAR 11
 M83: "YEAR 12
 N83: "YEAR 13
 O83: "YEAR 14
 P83: "YEAR 15
 A85: 'Equipment Purchase
 B85: +B11-B48
 C85: +C11-C48
 D85: +D11-D48
 E85: +E11-E48
 F85: +F11-F48
 G85: +G11-G48
 H85: +H11-H48
 I85: +I11-I48
 J85: +J11-J48
 K85: +K11-K48
 L85: +L11-L48
 M85: +M11-M48
 N85: +N11-N48
 O85: +O11-O48
 P85: +P11-P48
 A86: 'Equip. Ship. & Install.
 B86: +B12-B49
 C86: +C12-C49
 D86: +D12-D49
 E86: +E12-E49
 F86: +F12-F49
 G86: +G12-G49
 H86: +H12-H49
 I86: +I12-I49
 J86: +J12-J49
 K86: +K12-K49
 L86: +L12-L49
 M86: +M12-M49
 N86: +N12-N49
 O86: +O12-O49
 P86: +P12-P49
 A87: 'Special Tooling
 B87: +B13-B50
 C87: +C13-C50
 D87: +D13-D50
 E87: +E13-E50
 F87: +F13-F50
 G87: +G13-G50

H87: +H13-H50
I87: +I13-I50
J87: +J13-J50
K87: +K13-K50
L87: +L13-L50
M87: +M13-M50
N87: +N13-N50
O87: +O13-O50
P87: +P13-P50
A88: 'Fixtures
B88: +B14-B51
C88: +C14-C51
D88: +D14-D51
E88: +E14-E51
F88: +F14-F51
G88: +G14-G51
H88: +H14-H51
I88: +I14-I51
J88: +J14-J51
K88: +K14-K51
L88: +L14-L51
M88: +M14-M51
N88: +N14-N51
O88: +O14-O51
P88: +P14-P51
A89: 'Programming
B89: +B15-B52
C89: +C15-C52
D89: +D15-D52
E89: +E15-E52
F89: +F15-F52
G89: +G15-G52
H89: +H15-H52
I89: +I15-I52
J89: +J15-J52
K89: +K15-K52
L89: +L15-L52
M89: +M15-M52
N89: +N15-N52
O89: +O15-O52
P89: +P15-P52
A90: 'Supplied & Material
B90: +B16-B53
C90: +C16-C53
D90: +D16-D53
E90: +E16-E53
F90: +F16-F53
G90: +G16-G53
H90: +H16-H53
I90: +I16-I53

J90: +J16-J53
 K90: +K16-K53
 L90: +L16-L53
 M90: +M16-M53
 N90: +N16-N53
 O90: +O16-O53
 P90: +P16-P53
 A91: 'Equipment Maintenance
 B91: +B17-B54
 C91: +C17-C54
 D91: +D17-D54
 E91: +E17-E54
 F91: +F17-F54
 G91: +G17-G54
 H91: +H17-H54
 I91: +I17-I54
 J91: +J17-J54
 K91: +K17-K54
 L91: +L17-L54
 M91: +M17-M54
 N91: +N17-N54
 O91: +O17-O54
 P91: +P17-P54
 A92: 'Equipment Repair
 B92: +B18-B55
 C92: +C18-C55
 D92: +D18-D55
 E92: +E18-E55
 F92: +F18-F55
 G92: +G18-G55
 H92: +H18-H55
 I92: +I18-I55
 J92: +J18-J55
 K92: +K18-K55
 L92: +L18-L55
 M92: +M18-M55
 N92: +N18-N55
 O92: +O18-O55
 P92: +P18-P55
 A93: 'Equipment Overhaul
 B93: +B19-B56
 C93: +C19-C56
 D93: +D19-D56
 E93: +E19-E56
 F93: +F19-F56
 G93: +G19-G56
 H93: +H19-H56
 I93: +I19-I56
 J93: +J19-J56
 K93: +K19-K56

L93: +L19-L56
 M93: +M19-M56
 N93: +N19-N56
 O93: +O19-O56
 P93: +P19-P56
 A94: 'Facilities Modifications
 B94: +B20-B57
 C94: +C20-C57
 D94: +D20-D57
 E94: +E20-E57
 F94: +F20-F57
 G94: +G20-G57
 H94: +H20-H57
 I94: +I20-I57
 J94: +J20-J57
 K94: +K20-K57
 L94: +L20-L57
 M94: +M20-M57
 N94: +N20-N57
 O94: +O20-O57
 P94: +P20-P57
 A95: 'Manufacturing Labor
 B95: +B21-B58
 C95: +C21-C58
 D95: +D21-D58
 E95: +E21-E58
 F95: +F21-F58
 G95: +G21-G58
 H95: +H21-H58
 I95: +I21-I58
 J95: +J21-J58
 K95: +K21-K58
 L95: +L21-L58
 M95: +M21-M58
 N95: +N21-N58
 O95: +O21-O58
 P95: +P21-P58
 A96: 'Engineering Labor
 B96: +B22-B59
 C96: +C22-C59
 D96: +D22-D59
 E96: +E22-E59
 F96: +F22-F59
 G96: +G22-G59
 H96: +H22-H59
 I96: +I22-I59
 J96: +J22-J59
 K96: +K22-K59
 L96: +L22-L59
 M96: +M22-M59

N96: +N22-N59
 O96: +O22-O59
 P96: +P22-P59
 A97: 'Production Control
 B97: +B23-B60
 C97: +C23-C60
 D97: +D23-D60
 E97: +E23-E60
 F97: +F23-F60
 G97: +G23-G60
 H97: +H23-H60
 I97: +I23-I60
 J97: +J23-J60
 K97: +K23-K60
 L97: +L23-L60
 M97: +M23-M60
 N97: +N23-N60
 O97: +O23-O60
 P97: +P23-P60
 A98: 'Shop Supervision
 B98: +B24-B61
 C98: +C24-C61
 D98: +D24-D61
 E98: +E24-E61
 F98: +F24-F61
 G98: +G24-G61
 H98: +H24-H61
 I98: +I24-I61
 J98: +J24-J61
 K98: +K24-K61
 L98: +L24-L61
 M98: +M24-M61
 N98: +N24-N61
 O98: +O24-O61
 P98: +P24-P61
 A99: 'Material Handling
 B99: +B25-B62
 C99: +C25-C62
 D99: +D25-D62
 E99: +E25-E62
 F99: +F25-F62
 G99: +G25-G62
 H99: +H25-H62
 I99: +I25-I62
 J99: +J25-J62
 K99: +K25-K62
 L99: +L25-L62
 M99: +M25-M62
 N99: +N25-N62
 O99: +O25-O62

P99: +P25-P62
 A100: 'Inspection
 B100: +B26-B63
 C100: +C26-C63
 D100: +D26-D63
 E100: +E26-E63
 F100: +F26-F63
 G100: +G26-G63
 H100: +H26-H63
 I100: +I26-I63
 J100: +J26-J63
 K100: +K26-K63
 L100: +L26-L63
 M100: +M26-M63
 N100: +N26-N63
 O100: +O26-O63
 P100: +P26-P63
 A1: 'ROBOTICS/FMS INVESTMENT
 A2: 'DECISION MODEL
 A3: '(Lotus 1-2-3 FLN:RIDM)
 A8: 'OLD METHOD
 B8: "OLD METHOD
 C8: "OLD METHOD
 D8: "OLD METHOD
 E8: "OLD METHOD
 F8: "OLD METHOD
 G8: "OLD METHOD
 H8: "OLD METHOD
 I8: "OLD METHOD
 J8: "OLD METHOD
 K8: "OLD METHOD
 L8: "OLD METHOD
 M8: "OLD METHOD
 N8: "OLD METHOD
 O8: "OLD METHOD
 P8: "OLD METHOD
 A9: 'COST ELEMENTS
 B9: "YEAR 1
 C9: "YEAR 2
 D9: "YEAR 3
 E9: "YEAR 4
 F9: "YEAR 5
 G9: "YEAR 6
 H9: "YEAR 7
 I9: "YEAR 8
 J9: "YEAR 9
 K9: "YEAR 10
 L9: "YEAR 11
 M9: "YEAR 12
 N9: "YEAR 13

O9: "YEAR 14
 P9: "YEAR 15
 A11: 'Equipment Purchase
 A12: 'Equip. Ship. & Install.
 A13: 'Special Tooling
 A14: 'Fixtures
 A15: 'Programming
 A16: 'Supplied & Material
 A17: 'Equipment Maintenance
 A18: 'Equipment Repair
 A19: 'Equipment Overhaul
 A20: 'Facilities Modifications
 A21: 'Manufacturing Labor
 A22: 'Engineering Labor
 A23: 'Production Control
 A24: 'Shop Supervision
 A25: 'Material Handling
 A26: 'Inspection
 A27: 'Training
 A28: 'Inventory Costs
 A29: 'Scrap & Rework
 A30: 'Floor Space Costs
 A31: 'Other MFG. Overhead Costs
 A32: 'Engineering Overhead
 A33: 'Administrative Costs
 A34: 'Property Taxes
 A35: 'Utilities
 A36: 'Interest (Cost of borrowed \$)
 A37: 'Other Expenses
 A39: 'Equipment Salvage Value
 A41: 'TOTAL COST, OLD METHOD
 B41: (C2) @SUM(B37..B11)-B39
 C41: (C2) @SUM(C37..C11)-C39
 D41: (C2) @SUM(D37..D11)-D39
 E41: (C2) @SUM(E37..E11)-E39
 F41: (C2) @SUM(F37..F11)-F39
 G41: (C2) @SUM(G37..G11)-G39
 H41: (C2) @SUM(H37..H11)-H39
 I41: (C2) @SUM(I37..I11)-I39
 J41: (C2) @SUM(J37..J11)-J39
 K41: (C2) @SUM(K37..K11)-K39
 L41: (C2) @SUM(L37..L11)-L39
 M41: (C2) @SUM(M37..M11)-M39
 N41: (C2) @SUM(N37..N11)-N39
 O41: (C2) @SUM(O37..O11)-O39
 P41: (C2) @SUM(P37..P11)-P39
 A43: ' - - - - -
 B43: ' - - - - -
 C43: ' - - - - -
 D43: ' - - - - -

E43: ' - - - - -
 F43: ' - - - - -
 G43: ' - - - - -
 H43: ' - - - - -
 I43: ' - - - - -
 J43: ' - - - - -
 K43: ' - - - - -
 L43: ' - - - - -
 M43: ' - - - - -
 N43: ' - - - - -
 O43: ' - - - - -
 P43: ' - - - - -

A45: 'NEW METHOD
 B45: "NEW METHOD
 C45: "NEW METHOD
 D45: "NEW METHOD
 E45: "NEW METHOD
 F45: "NEW METHOD
 G45: "NEW METHOD
 H45: "NEW METHOD
 I45: "NEW METHOD
 J45: "NEW METHOD
 K45: "NEW METHOD
 L45: "NEW METHOD
 M45: "NEW METHOD
 N45: "NEW METHOD
 O45: "NEW METHOD
 P45: "NEW METHOD

A46: 'COST ELEMENTS
 B46: "YEAR 1
 C46: "YEAR 2
 D46: "YEAR 3
 E46: "YEAR 4
 F46: "YEAR 5
 G46: "YEAR 6
 H46: "YEAR 7
 I46: "YEAR 8
 J46: "YEAR 9
 K46: "YEAR 10
 L46: "YEAR 11
 M46: "YEAR 12
 N46: "YEAR 13
 O46: "YEAR 14
 P46: "YEAR 15

A48: 'Equipment Purchase
 A49: 'Equip. Ship. & Install.
 A50: 'Special Tooling
 A51: 'Fixtures
 A52: 'Programming
 A53: 'Supplied & Material

A54: 'Equipment Maintenance
 A55: 'Equipment Repair
 A56: 'Equipment Overhaul
 A57: 'Facilities Modifications
 A58: 'Manufacturing Labor
 A59: 'Engineering Labor
 A60: 'Production Control
 A61: 'Shop Supervision
 A62: 'Material Handling
 A63: 'Inspection
 A64: 'Training
 A65: 'Inventory Costs
 A66: 'Scrap & Rework
 A67: 'Floor Space Costs
 A68: 'Other MFG. Overhead Costs
 A69: 'Engineering Overhead
 A70: 'Administrative Costs
 A71: 'Property Taxes
 A72: 'Utilities
 A73: 'Interest (Cost of borrowed \$)
 A74: 'Other Expenses
 A76: 'Equipment Salvage Value
 A78: 'TOTAL COST, NEW METHOD
 B78: (C2) @SUM(B74..B48)-B76
 C78: (C2) @SUM(C74..C48)-C76
 D78: (C2) @SUM(D74..D48)-D76
 E78: (C2) @SUM(E74..E48)-E76
 F78: (C2) @SUM(F74..F48)-F76
 G78: (C2) @SUM(G74..G48)-G76
 H78: (C2) @SUM(H74..H48)-H76
 I78: (C2) @SUM(I74..I48)-I76
 J78: (C2) @SUM(J74..J48)-J76
 K78: (C2) @SUM(K74..K48)-K76
 L78: (C2) @SUM(L74..L48)-L76
 M78: (C2) @SUM(M74..M48)-M76
 N78: (C2) @SUM(N74..N48)-N76
 O78: (C2) @SUM(O74..O48)-O76
 P78: (C2) @SUM(P74..P48)-P76
 A80: \-
 B80: \-
 C80: \-
 D80: \-
 E80: \-
 F80: \-
 G80: \-
 H80: \-
 I80: \-
 J80: \-
 K80: \-
 L80: \-

M80: \-
 N80: \-
 O80: \-
 P80: \-
 A81: 'CASH FLOW FROM INVESTMENT
 B83: "YEAR 1
 C83: "YEAR 2
 D83: "YEAR 3
 E83: "YEAR 4
 F83: "YEAR 5
 G83: "YEAR 6
 H83: "YEAR 7
 I83: "YEAR 8
 J83: "YEAR 9
 K83: "YEAR 10
 L83: "YEAR 11
 M83: "YEAR 12
 N83: "YEAR 13
 O83: "YEAR 14
 P83: "YEAR 15
 A85: 'Equipment Purchase
 B85: +B11-B48
 C85: +C11-C48
 D85: +D11-D48
 E85: +E11-E48
 F85: +F11-F48
 G85: +G11-G48
 H85: +H11-H48
 I85: +I11-I48
 J85: +J11-J48
 K85: +K11-K48
 L85: +L11-L48
 M85: +M11-M48
 N85: +N11-N48
 O85: +O11-O48
 P85: +P11-P48
 A86: 'Equip. Ship. & Install.
 B86: +B12-B49
 C86: +C12-C49
 D86: +D12-D49
 E86: +E12-E49
 F86: +F12-F49
 G86: +G12-G49
 H86: +H12-H49
 I86: +I12-I49
 J86: +J12-J49
 K86: +K12-K49
 L86: +L12-L49
 M86: +M12-M49
 N86: +N12-N49

O86: +O12-O49
 P86: +P12-P49
 A87: 'Special Tooling
 B87: +B13-B50
 C87: +C13-C50
 D87: +D13-D50
 E87: +E13-E50
 F87: +F13-F50
 G87: +G13-G50
 H87: +H13-H50
 I87: +I13-I50
 J87: +J13-J50
 K87: +K13-K50
 L87: +L13-L50
 M87: +M13-M50
 N87: +N13-N50
 O87: +O13-O50
 P87: +P13-P50
 A88: 'Fixtures
 B88: +B14-B51
 C88: +C14-C51
 D88: +D14-D51
 E88: +E14-E51
 F88: +F14-F51
 G88: +G14-G51
 H88: +H14-H51
 I88: +I14-I51
 J88: +J14-J51
 K88: +K14-K51
 L88: +L14-L51
 M88: +M14-M51
 N88: +N14-N51
 O88: +O14-O51
 P88: +P14-P51
 A89: 'Programming
 B89: +B15-B52
 C89: +C15-C52
 D89: +D15-D52
 E89: +E15-E52
 F89: +F15-F52
 G89: +G15-G52
 H89: +H15-H52
 I89: +I15-I52
 J89: +J15-J52
 K89: +K15-K52
 L89: +L15-L52
 M89: +M15-M52
 N89: +N15-N52
 O89: +O15-O52
 P89: +P15-P52

A90: 'Supplied & Material
 B90: +B16-B53
 C90: +C16-C53
 D90: +D16-D53
 E90: +E16-E53
 F90: +F16-F53
 G90: +G16-G53
 H90: +H16-H53
 I90: +I16-I53
 J90: +J16-J53
 K90: +K16-K53
 L90: +L16-L53
 M90: +M16-M53
 N90: +N16-N53
 O90: +O16-O53
 P90: +P16-P53
 A91: 'Equipment Maintenance
 B91: +B17-B54
 C91: +C17-C54
 D91: +D17-D54
 E91: +E17-E54
 F91: +F17-F54
 G91: +G17-G54
 H91: +H17-H54
 I91: +I17-I54
 J91: +J17-J54
 K91: +K17-K54
 L91: +L17-L54
 M91: +M17-M54
 N91: +N17-N54
 O91: +O17-O54
 P91: +P17-P54
 A92: 'Equipment Repair
 B92: +B18-B55
 C92: +C18-C55
 D92: +D18-D55
 E92: +E18-E55
 F92: +F18-F55
 G92: +G18-G55
 H92: +H18-H55
 I92: +I18-I55
 J92: +J18-J55
 K92: +K18-K55
 L92: +L18-L55
 M92: +M18-M55
 N92: +N18-N55
 O92: +O18-O55
 P92: +P18-P55
 A93: 'Equipment Overhaul
 B93: +B19-B56

C93: +C19-C56
 D93: +D19-D56
 E93: +E19-E56
 F93: +F19-F56
 G93: +G19-G56
 H93: +H19-H56
 I93: +I19-I56
 J93: +J19-J56
 K93: +K19-K56
 L93: +L19-L56
 M93: +M19-M56
 N93: +N19-N56
 O93: +O19-O56
 P93: +P19-P56
 A94: 'Facilities Modifications
 B94: +B20-B57
 C94: +C20-C57
 D94: +D20-D57
 E94: +E20-E57
 F94: +F20-F57
 G94: +G20-G57
 H94: +H20-H57
 I94: +I20-I57
 J94: +J20-J57
 K94: +K20-K57
 L94: +L20-L57
 M94: +M20-M57
 N94: +N20-N57
 O94: +O20-O57
 P94: +P20-P57
 A95: 'Manufacturing Labor
 B95: +B21-B58
 C95: +C21-C58
 D95: +D21-D58
 E95: +E21-E58
 F95: +F21-F58
 G95: +G21-G58
 H95: +H21-H58
 I95: +I21-I58
 J95: +J21-J58
 K95: +K21-K58
 L95: +L21-L58
 M95: +M21-M58
 N95: +N21-N58
 O95: +O21-O58
 P95: +P21-P58
 A96: 'Engineering Labor
 B96: +B22-B59
 C96: +C22-C59
 D96: +D22-D59

E96: +E22-E59
 F96: +F22-F59
 G96: +G22-G59
 H96: +H22-H59
 I96: +I22-I59
 J96: +J22-J59
 K96: +K22-K59
 L96: +L22-L59
 M96: +M22-M59
 N96: +N22-N59
 O96: +O22-O59
 P96: +P22-P59
 A97: 'Production Control
 B97: +B23-B60
 C97: +C23-C60
 D97: +D23-D60
 E97: +E23-E60
 F97: +F23-F60
 G97: +G23-G60
 H97: +H23-H60
 I97: +I23-I60
 J97: +J23-J60
 K97: +K23-K60
 L97: +L23-L60
 M97: +M23-M60
 N97: +N23-N60
 O97: +O23-O60
 P97: +P23-P60
 A98: 'Shop Supervision
 B98: +B24-B61
 C98: +C24-C61
 D98: +D24-D61
 E98: +E24-E61
 F98: +F24-F61
 G98: +G24-G61
 H98: +H24-H61
 I98: +I24-I61
 J98: +J24-J61
 K98: +K24-K61
 L98: +L24-L61
 M98: +M24-M61
 N98: +N24-N61
 O98: +O24-O61
 P98: +P24-P61
 A99: 'Material Handling
 B99: +B25-B62
 C99: +C25-C62
 D99: +D25-D62
 E99: +E25-E62
 F99: +F25-F62

G99: +G25-G62
 H99: +H25-H62
 I99: +I25-I62
 J99: +J25-J62
 K99: +K25-K62
 L99: +L25-L62
 M99: +M25-M62
 N99: +N25-N62
 O99: +O25-O62
 P99: +P25-P62
 A100: 'Inspection
 B100: +B26-B63
 C100: +C26-C63
 D100: +D26-D63
 E100: +E26-E63
 F100: +F26-F63
 G100: +G26-G63
 H100: +H26-H63
 I100: +I26-I63
 J100: +J26-J63
 K100: +K26-K63
 L100: +L26-L63
 M100: +M26-M63
 N100: +N26-N63
 O100: +O26-O63
 P100: +P26-P63
 A1: 'ROBOTICS/FMS INVESTMENT
 A2: 'DECISION MODEL
 A3: '(Lotus 1-2-3 FLN:RIDM)
 A8: 'OLD METHOD
 B8: "OLD METHOD
 C8: "OLD METHOD
 D8: "OLD METHOD
 E8: "OLD METHOD
 F8: "OLD METHOD
 G8: "OLD METHOD
 H8: "OLD METHOD
 I8: "OLD METHOD
 J8: "OLD METHOD
 K8: "OLD METHOD
 L8: "OLD METHOD
 M8: "OLD METHOD
 N8: "OLD METHOD
 O8: "OLD METHOD
 P8: "OLD METHOD
 A9: 'COST ELEMENTS
 B9: "YEAR 1
 C9: "YEAR 2
 D9: "YEAR 3
 E9: "YEAR 4

F9: "YEAR 5
 G9: "YEAR 6
 H9: "YEAR 7
 I9: "YEAR 8
 J9: "YEAR 9
 K9: "YEAR 10
 L9: "YEAR 11
 M9: "YEAR 12
 N9: "YEAR 13
 O9: "YEAR 14
 P9: "YEAR 15
 A11: 'Equipment Purchase
 A12: 'Equip. Ship. & Install.
 A13: 'Special Tooling
 A14: 'Fixtures
 A15: 'Programming
 A16: 'Supplied & Material
 A17: 'Equipment Maintenance
 A18: 'Equipment Repair
 A19: 'Equipment Overhaul
 A20: 'Facilities Modifications
 A21: 'Manufacturing Labor
 A22: 'Engineering Labor
 A23: 'Production Control
 A24: 'Shop Supervision
 A25: 'Material Handling
 A26: 'Inspection
 A27: 'Training
 A28: 'Inventory Costs
 A29: 'Scrap & Rework
 A30: 'Floor Space Costs
 A31: 'Other MFG. Overhead Costs
 A32: 'Engineering Overhead
 A33: 'Administrative Costs
 A34: 'Property Taxes
 A35: 'Utilities
 A36: 'Interest (Cost of borrowed \$)
 A37: 'Other Expenses
 A39: 'Equipment Salvage Value
 A41: 'TOTAL COST, OLD METHOD
 B41: (C2) @SUM(B37..B11)-B39
 C41: (C2) @SUM(C37..C11)-C39
 D41: (C2) @SUM(D37..D11)-D39
 E41: (C2) @SUM(E37..E11)-E39
 F41: (C2) @SUM(F37..F11)-F39
 G41: (C2) @SUM(G37..G11)-G39
 H41: (C2) @SUM(H37..H11)-H39
 I41: (C2) @SUM(I37..I11)-I39
 J41: (C2) @SUM(J37..J11)-J39
 K41: (C2) @SUM(K37..K11)-K39

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L41: (C2) @SUM(L37..L11)-L39
M41: (C2) @SUM(M37..M11)-M39
N41: (C2) @SUM(N37..N11)-N39
O41: (C2) @SUM(O37..O11)-O39
P41: (C2) @SUM(P37..P11)-P39
A43: ' - - - - - - - - - - - - - - -
B43: ' - - - - - - - - - - - - - - -
C43: ' - - - - - - - - - - - - - - -
D43: ' - - - - - - - - - - - - - - -
E43: ' - - - - - - - - - - - - - - -
F43: ' - - - - - - - - - - - - - - -
G43: ' - - - - - - - - - - - - - - -
H43: ' - - - - - - - - - - - - - - -
I43: ' - - - - - - - - - - - - - - -
J43: ' - - - - - - - - - - - - - - -
K43: ' - - - - - - - - - - - - - - -
L43: ' - - - - - - - - - - - - - - -
M43: ' - - - - - - - - - - - - - - -
N43: ' - - - - - - - - - - - - - - -
O43: ' - - - - - - - - - - - - - - -
P43: ' - - - -
A45: 'NEW METHOD
B45: "NEW METHOD
C45: "NEW METHOD
D45: "NEW METHOD
E45: "NEW METHOD
F45: "NEW METHOD
G45: "NEW METHOD
H45: "NEW METHOD
I45: "NEW METHOD
J45: "NEW METHOD
K45: "NEW METHOD
L45: "NEW METHOD
M45: "NEW METHOD
N45: "NEW METHOD
O45: "NEW METHOD
P45: "NEW METHOD
A46: 'COST ELEMENTS
B46: "YEAR 1
C46: "YEAR 2
D46: "YEAR 3
E46: "YEAR 4
F46: "YEAR 5
G46: "YEAR 6
H46: "YEAR 7
I46: "YEAR 8
J46: "YEAR 9
K46: "YEAR 10
L46: "YEAR 11
M46: "YEAR 12

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N46: "YEAR 13
 O46: "YEAR 14
 P46: "YEAR 15
 A48: 'Equipment Purchase
 A49: 'Equip. Ship. & Install.
 A50: 'Special Tooling
 A51: 'Fixtures
 A52: 'Programming
 A53: 'Supplied & Material
 A54: 'Equipment Maintenance
 A55: 'Equipment Repair
 A56: 'Equipment Overhaul
 A57: 'Facilities Modifications
 A58: 'Manufacturing Labor
 A59: 'Engineering Labor
 A60: 'Production Control
 A61: 'Shop Supervision
 A62: 'Material Handling
 A63: 'Inspection
 A64: 'Training
 A65: 'Inventory Costs
 A66: 'Scrap & Rework
 A67: 'Floor Space Costs
 A68: 'Other MFG. Overhead Costs
 A69: 'Engineering Overhead
 A70: 'Administrative Costs
 A71: 'Property Taxes
 A72: 'Utilities
 A73: 'Interest (Cost of borrowed \$)
 A74: 'Other Expenses
 A76: 'Equipment Salvage Value
 A78: 'TOTAL COST, NEW METHOD
 B78: (C2) @SUM(B74..B48)-B76
 C78: (C2) @SUM(C74..C48)-C76
 D78: (C2) @SUM(D74..D48)-D76
 E78: (C2) @SUM(E74..E48)-E76
 F78: (C2) @SUM(F74..F48)-F76
 G78: (C2) @SUM(G74..G48)-G76
 H78: (C2) @SUM(H74..H48)-H76
 I78: (C2) @SUM(I74..I48)-I76
 J78: (C2) @SUM(J74..J48)-J76
 K78: (C2) @SUM(K74..K48)-K76
 L78: (C2) @SUM(L74..L48)-L76
 M78: (C2) @SUM(M74..M48)-M76
 N78: (C2) @SUM(N74..N48)-N76
 O78: (C2) @SUM(O74..O48)-O76
 P78: (C2) @SUM(P74..P48)-P76
 A80: \-
 B80: \-
 C80: \-

D80: \-
 E80: \-
 F80: \-
 G80: \-
 H80: \-
 I80: \-
 J80: \-
 K80: \-
 L80: \-
 M80: \-
 N80: \-
 O80: \-
 P80: \-
 A81: 'CASH FLOW FROM INVESTMENT
 B83: "YEAR 1
 C83: "YEAR 2
 D83: "YEAR 3
 E83: "YEAR 4
 F83: "YEAR 5
 G83: "YEAR 6
 H83: "YEAR 7
 I83: "YEAR 8
 J83: "YEAR 9
 K83: "YEAR 10
 L83: "YEAR 11
 M83: "YEAR 12
 N83: "YEAR 13
 O83: "YEAR 14
 P83: "YEAR 15
 A85: 'Equipment Purchase
 B85: +B11-B48
 C85: +C11-C48
 D85: +D11-D48
 E85: +E11-E48
 F85: +F11-F48
 G85: +G11-G48
 H85: +H11-H48
 I85: +I11-I48
 J85: +J11-J48
 K85: +K11-K48
 L85: +L11-L48
 M85: +M11-M48
 N85: +N11-N48
 O85: +O11-O48
 P85: +P11-P48
 A86: 'Equip. Ship. & Install.
 B86: +B12-B49
 C86: +C12-C49
 D86: +D12-D49
 E86: +E12-E49

F86: +F12-F49
 G86: +G12-G49
 H86: +H12-H49
 I86: +I12-I49
 J86: +J12-J49
 K86: +K12-K49
 L86: +L12-L49
 M86: +M12-M49
 N86: +N12-N49
 O86: +O12-O49
 P86: +P12-P49
 A87: 'Special Tooling
 B87: +B13-B50
 C87: +C13-C50
 D87: +D13-D50
 E87: +E13-E50
 F87: +F13-F50
 G87: +G13-G50
 H87: +H13-H50
 I87: +I13-I50
 J87: +J13-J50
 K87: +K13-K50
 L87: +L13-L50
 M87: +M13-M50
 N87: +N13-N50
 O87: +O13-O50
 P87: +P13-P50
 A88: 'Fixtures
 B88: +B14-B51
 C88: +C14-C51
 D88: +D14-D51
 E88: +E14-E51
 F88: +F14-F51
 G88: +G14-G51
 H88: +H14-H51
 I88: +I14-I51
 J88: +J14-J51
 K88: +K14-K51
 L88: +L14-L51
 M88: +M14-M51
 N88: +N14-N51
 O88: +O14-O51
 P88: +P14-P51
 A89: 'Programming
 B89: +B15-B52
 C89: +C15-C52
 D89: +D15-D52
 E89: +E15-E52
 F89: +F15-F52
 G89: +G15-G52

H89: +H15-H52
 I89: +I15-I52
 J89: +J15-J52
 K89: +K15-K52
 L89: +L15-L52
 M89: +M15-M52
 N89: +N15-N52
 O89: +O15-O52
 P89: +P15-P52
 A90: 'Supplied & Material
 B90: +B16-B53
 C90: +C16-C53
 D90: +D16-D53
 E90: +E16-E53
 F90: +F16-F53
 G90: +G16-G53
 H90: +H16-H53
 I90: +I16-I53
 J90: +J16-J53
 K90: +K16-K53
 L90: +L16-L53
 M90: +M16-M53
 N90: +N16-N53
 O90: +O16-O53
 P90: +P16-P53
 A91: 'Equipment Maintenance
 B91: +B17-B54
 C91: +C17-C54
 D91: +D17-D54
 E91: +E17-E54
 F91: +F17-F54
 G91: +G17-G54
 H91: +H17-H54
 I91: +I17-I54
 J91: +J17-J54
 K91: +K17-K54
 L91: +L17-L54
 M91: +M17-M54
 N91: +N17-N54
 O91: +O17-O54
 P91: +P17-P54
 A92: 'Equipment Repair
 B92: +B18-B55
 C92: +C18-C55
 D92: +D18-D55
 E92: +E18-E55
 F92: +F18-F55
 G92: +G18-G55
 H92: +H18-H55
 I92: +I18-I55

J92: +J18-J55
 K92: +K18-K55
 L92: +L18-L55
 M92: +M18-M55
 N92: +N18-N55
 O92: +O18-O55
 P92: +P18-P55
 A93: 'Equipment Overhaul
 B93: +B19-B56
 C93: +C19-C56
 D93: +D19-D56
 E93: +E19-E56
 F93: +F19-F56
 G93: +G19-G56
 H93: +H19-H56
 I93: +I19-I56
 J93: +J19-J56
 K93: +K19-K56
 L93: +L19-L56
 M93: +M19-M56
 N93: +N19-N56
 O93: +O19-O56
 P93: +P19-P56
 A94: 'Facilities Modifications
 B94: +B20-B57
 C94: +C20-C57
 D94: +D20-D57
 E94: +E20-E57
 F94: +F20-F57
 G94: +G20-G57
 H94: +H20-H57
 I94: +I20-I57
 J94: +J20-J57
 K94: +K20-K57
 L94: +L20-L57
 M94: +M20-M57
 N94: +N20-N57
 O94: +O20-O57
 P94: +P20-P57
 A95: 'Manufacturing Labor
 B95: +B21-B58
 C95: +C21-C58
 D95: +D21-D58
 E95: +E21-E58
 F95: +F21-F58
 G95: +G21-G58
 H95: +H21-H58
 I95: +I21-I58
 J95: +J21-J58
 K95: +K21-K58

L95: +L21-L58
 M95: +M21-M58
 N95: +N21-N58
 O95: +O21-O58
 P95: +P21-P58
 A96: 'Engineering Labor
 B96: +B22-B59
 C96: +C22-C59
 D96: +D22-D59
 E96: +E22-E59
 F96: +F22-F59
 G96: +G22-G59
 H96: +H22-H59
 I96: +I22-I59
 J96: +J22-J59
 K96: +K22-K59
 L96: +L22-L59
 M96: +M22-M59
 N96: +N22-N59
 O96: +O22-O59
 P96: +P22-P59
 A97: 'Production Control
 B97: +B23-B60
 C97: +C23-C60
 D97: +D23-D60
 E97: +E23-E60
 F97: +F23-F60
 G97: +G23-G60
 H97: +H23-H60
 I97: +I23-I60
 J97: +J23-J60
 K97: +K23-K60
 L97: +L23-L60
 M97: +M23-M60
 N97: +N23-N60
 O97: +O23-O60
 P97: +P23-P60
 A98: 'Shop Supervision
 B98: +B24-B61
 C98: +C24-C61
 D98: +D24-D61
 E98: +E24-E61
 F98: +F24-F61
 G98: +G24-G61
 H98: +H24-H61
 I98: +I24-I61
 J98: +J24-J61
 K98: +K24-K61
 L98: +L24-L61
 M98: +M24-M61

A101: 'Training
 B101: +B27-B64
 C101: +C27-C64
 D101: +D27-D64
 E101: +E27-E64
 F101: +F27-F64
 G101: +G27-G64
 H101: +H27-H64
 I101: +I27-I64
 J101: +J27-J64
 K101: +K27-K64
 L101: +L27-L64
 M101: +M27-M64
 N101: +N27-N64
 O101: +O27-O64
 P101: +P27-P64
 A102: 'Inventory Costs
 B102: +B28-B65
 C102: +C28-C65
 D102: +D28-D65
 E102: +E28-E65
 F102: +F28-F65
 G102: +G28-G65
 H102: +H28-H65
 I102: +I28-I65
 J102: +J28-J65
 K102: +K28-K65
 L102: +L28-L65
 M102: +M28-M65
 N102: +N28-N65
 O102: +O28-O65
 P102: +P28-P65
 A103: 'Scrap & Rework
 B103: +B29-B66
 C103: +C29-C66
 D103: +D29-D66
 E103: +E29-E66
 F103: +F29-F66
 G103: +G29-G66
 H103: +H29-H66
 I103: +I29-I66
 J103: +J29-J66
 K103: +K29-K66
 L103: +L29-L66
 M103: +M29-M66
 N103: +N29-N66
 O103: +O29-O66
 P103: +P29-P66
 A104: 'Floor Space Costs
 B104: +B30-B67
 C104: +C30-C67
 D104: +D30-D67
 E104: +E30-E67
 F104: +F30-F67
 G104: +G30-G67
 H104: +H30-H67
 I104: +I30-I67

J104: +J30-J67
 K104: +K30-K67
 L104: +L30-L67
 M104: +M30-M67
 N104: +N30-N67
 O104: +O30-O67
 P104: +P30-P67
 A105: 'Other MFG. Overhead Costs
 B105: +B31-B68
 C105: +C31-C68
 D105: +D31-D68
 E105: +E31-E68
 F105: +F31-F68
 G105: +G31-G68
 H105: +H31-H68
 I105: +I31-I68
 J105: +J31-J68
 K105: +K31-K68
 L105: +L31-L68
 M105: +M31-M68
 N105: +N31-N68
 O105: +O31-O68
 P105: +P31-P68
 A106: 'Engineering Overhead
 B106: +B32-B69
 C106: +C32-C69
 D106: +D32-D69
 E106: +E32-E69
 F106: +F32-F69
 G106: +G32-G69
 H106: +H32-H69
 I106: +I32-I69
 J106: +J32-J69
 K106: +K32-K69
 L106: +L32-L69
 M106: +M32-M69
 N106: +N32-N69
 O106: +O32-O69
 P106: +P32-P69
 A107: 'Administrative Costs
 B107: +B33-B70
 C107: +C33-C70
 D107: +D33-D70
 E107: +E33-E70
 F107: +F33-F70
 G107: +G33-G70
 H107: +H33-H70
 I107: +I33-I70
 J107: +J33-J70
 K107: +K33-K70

L107: +L33-L70
 M107: +M33-M70
 N107: +N33-N70
 O107: +O33-O70
 P107: +P33-P70
 A108: 'Property Taxes
 B108: +B34-B71
 C108: +C34-C71
 D108: +D34-D71
 E108: +E34-E71
 F108: +F34-F71
 G108: +G34-G71
 H108: +H34-H71
 I108: +I34-I71
 J108: +J34-J71
 K108: +K34-K71
 L108: +L34-L71
 M108: +M34-M71
 N108: +N34-N71
 O108: +O34-O71
 P108: +P34-P71
 A109: 'Utilities
 B109: +B35-B72
 C109: +C35-C72
 D109: +D35-D72
 E109: +E35-E72
 F109: +F35-F72
 G109: +G35-G72
 H109: +H35-H72
 I109: +I35-I72
 J109: +J35-J72
 K109: +K35-K72
 L109: +L35-L72
 M109: +M35-M72
 N109: +N35-N72
 O109: +O35-O72
 P109: +P35-P72
 A110: 'Interest (Cost of borrowed \$)
 B110: +B36-B73
 C110: +C36-C73
 D110: +D36-D73
 E110: +E36-E73
 F110: +F36-F73
 G110: +G36-G73
 H110: +H36-H73
 I110: +I36-I73
 J110: +J36-J73
 K110: +K36-K73
 L110: +L36-L73
 M110: +M36-M73

N110: +N36-N73
 O110: +O36-O73
 P110: +P36-P73
 A111: Other Expenses
 B111: +B37-B74
 C111: +C37-C74
 D111: +D37-D74
 E111: +E37-E74
 F111: +F37-F74
 G111: +G37-G74
 H111: +H37-H74
 I111: +I37-I74
 J111: +J37-J74
 K111: +K37-K74
 L111: +L37-L74
 M111: +M37-M74
 N111: +N37-N74
 O111: +O37-O74
 P111: +P37-P74
 A113: Equipment Salvage Value
 B113: +B76-B39
 C113: +C76-C39
 D113: +D76-D39
 E113: +E76-E39
 F113: +F76-F39
 G113: +G76-G39
 H113: +H76-H39
 I113: +I76-I39
 J113: +J76-J39
 K113: +K76-K39
 L113: +L76-L39
 M113: +M76-M39
 N113: +N76-N39
 O113: +O76-O39
 P113: +P76-P39
 A115: NOMINAL CASH FLOW (NCF)
 B115: (C2) +B41-B78
 C115: (C2) +C41-C78
 D115: (C2) +D41-D78
 E115: (C2) +E41-E78
 F115: (C2) +F41-F78
 G115: (C2) +G41-G78
 H115: (C2) +H41-H78
 I115: (C2) +I41-I78
 J115: (C2) +J41-J78
 K115: (C2) +K41-K78
 L115: (C2) +L41-L78
 M115: (C2) +M41-M78
 N115: (C2) +N41-N78
 O115: (C2) +O41-O78

P115: (C2) +P41-P78
 A117: \-
 B117: \-
 C117: \-
 D117: \-
 E117: \-
 F117: \-
 G117: \-
 H117: \-
 I117: \-
 J117: \-
 K117: \-
 L117: \-
 M117: \-
 N117: \-
 O117: \-
 P117: \-
 A118: 'PRODUCTION QUANTITY ADJUSTMENT
 A119: '(BEFORE TAX)
 A122: 'PRODUCTION QUANTITY, OLD
 B122: "OLD METHOD
 C122: "OLD METHOD
 D122: "OLD METHOD
 E122: "OLD METHOD
 F122: "OLD METHOD
 G122: "OLD METHOD
 H122: "OLD METHOD
 I122: "OLD METHOD
 J122: "OLD METHOD
 K122: "OLD METHOD
 L122: "OLD METHOD
 M122: "OLD METHOD
 N122: "OLD METHOD
 O122: "OLD METHOD
 P122: "OLD METHOD
 A123: 'METHOD
 B123: "YEAR 1
 C123: "YEAR 2
 D123: "YEAR 3
 E123: "YEAR 4
 F123: "YEAR 5
 G123: "YEAR 6
 H123: "YEAR 7
 I123: "YEAR 8
 J123: "YEAR 9
 K123: "YEAR 10
 L123: "YEAR 11
 M123: "YEAR 12
 N123: "YEAR 13
 O123: "YEAR 14

P123: "YEAR 15
 A125: "GROSS ANNUAL THROUGHPUT (GAT)
 A127: " ITEM A
 A128: " ITEM B
 A129: " ITEM C
 A131: "AVERAGE COST PER UNIT(CPU)
 B131: (C2) +B41/+B125
 C131: (C2) +C41/+C125
 D131: (C2) +D41/+D125
 E131: (C2) +E41/+E125
 F131: (C2) +F41/+F125
 G131: (C2) +G41/+G125
 H131: (C2) +H41/+H125
 I131: (C2) +I41/+I125
 J131: (C2) +J41/+J125
 K131: (C2) +K41/+K125
 L131: (C2) +L41/+L125
 M131: (C2) +M41/+M125
 N131: (C2) +N41/+N125
 O131: (C2) +O41/+O125
 P131: (C2) +P41/+P125
 A133: \ -
 B133: \ -
 C133: \ -
 D133: \ -
 E133: \ -
 F133: \ -
 G133: \ -
 H133: \ -
 I133: \ -
 J133: \ -
 K133: \ -
 L133: \ -
 M133: \ -
 N133: \ -
 O133: \ -
 P133: \ -
 A135: "PRODUCTION QUANTITY, NEW
 B135: "NEW METHOD
 C135: "NEW METHOD
 D135: "NEW METHOD
 E135: "NEW METHOD
 F135: "NEW METHOD
 G135: "NEW METHOD
 H135: "NEW METHOD
 I135: "NEW METHOD
 J135: "NEW METHOD
 K135: "NEW METHOD
 L135: "NEW METHOD
 M135: "NEW METHOD

N135: "NEW METHOD
 O135: "NEW METHOD
 P135: "NEW METHOD
 A136: "METHOD
 B136: "YEAR 1
 C136: "YEAR 2
 D136: "YEAR 3
 E136: "YEAR 4
 F136: "YEAR 5
 G136: "YEAR 6
 H136: "YEAR 7
 I136: "YEAR 8
 J136: "YEAR 9
 K136: "YEAR 10
 L136: "YEAR 11
 M136: "YEAR 12
 N136: "YEAR 13
 O136: "YEAR 14
 P136: "YEAR 15
 A138: "GROSS ANNUAL THROUGHPUT (GAT)
 A140: " ITEM A
 A141: " ITEM B
 A142: " ITEM C
 A144: "AVERAGE COST PER UNIT(CPU)
 B144: (C2) +B78/+B138
 C144: (C2) +C78/+C138
 D144: (C2) +D78/+D138
 E144: (C2) +E78/+E138
 F144: (C2) +F78/+F138
 G144: (C2) +G78/+G138
 H144: (C2) +H78/+H138
 I144: (C2) +I78/+I138
 J144: (C2) +J78/+J138
 K144: (C2) +K78/+K138
 L144: (C2) +L78/+L138
 M144: (C2) +M78/+M138
 N144: (C2) +N78/+N138
 O144: (C2) +O78/+O138
 P144: (C2) +P78/+P138
 A146: \-
 B146: \-
 C146: \-
 D146: \-
 E146: \-
 F146: \-
 G146: \-
 H146: \-
 I146: \-
 J146: \-
 K146: \-

L146: \-
 M146: \-
 N146: \-
 O146: \-
 P146: \-
 A147: 'PRODUCTION QUANTITY ADJUSTMENT RESULTS
 A148: 'NEW METHOD AS COMPARED TO OLD METHOD
 B151: "YEAR 1
 C151: "YEAR 2
 D151: "YEAR 3
 E151: "YEAR 4
 F151: "YEAR 5
 G151: "YEAR 6
 H151: "YEAR 7
 I151: "YEAR 8
 J151: "YEAR 9
 K151: "YEAR 10
 L151: "YEAR 11
 M151: "YEAR 12
 N151: "YEAR 13
 O151: "YEAR 14
 P151: "YEAR 15
 A153: 'CHANGE IN GROSS THROUGHPUT
 B153: +B138-B125
 C153: +C138-C125
 D153: +D138-D125
 E153: +E138-E125
 F153: +F138-F125
 G153: +G138-G125
 H153: +H138-H125
 I153: +I138-I125
 J153: +J138-J125
 K153: +K138-K125
 L153: +L138-L125
 M153: +M138-M125
 N153: +N138-N125
 O153: +O138-O125
 P153: +P138-P125
 A155: '% CHANGE IN GROSS THROUGHPUT
 B155: (P1) +B153/B125
 C155: (P1) +C153/C125
 D155: (P1) +D153/D125
 E155: (P1) +E153/E125
 F155: (P1) +F153/F125
 G155: (P1) +G153/G125
 H155: (P1) +H153/H125
 I155: (P1) +I153/I125
 J155: (P1) +J153/J125
 K155: (P1) +K153/K125
 L155: (P1) +L153/L125

M155: (P1) +M153/M125
N155: (P1) +N153/N125
O155: (P1) +O153/O125
P155: (P1) +P153/P125
A157: 'CHANGE IN PRODUCTION COST/UNIT
B157: (C2) +B144-B131
C157: (C2) +C144-C131
D157: (C2) +D144-D131
E157: (C2) +E144-E131
F157: (C2) +F144-F131
G157: (C2) +G144-G131
H157: (C2) +H144-H131
I157: (C2) +I144-I131
J157: (C2) +J144-J131
K157: (C2) +K144-K131
L157: (C2) +L144-L131
M157: (C2) +M144-M131
N157: (C2) +N144-N131
O157: (C2) +O144-O131
P157: (C2) +P144-P131
A159: '% CHANGE IN PROD COST/UNIT
B159: (P1) (+B157/B131)
C159: (P1) (+C157/C131)
D159: (P1) (+D157/D131)
E159: (P1) (+E157/E131)
F159: (P1) (+F157/F131)
G159: (P1) (+G157/G131)
H159: (P1) (+H157/H131)
I159: (P1) (+I157/I131)
J159: (P1) (+J157/J131)
K159: (P1) (+K157/K131)
L159: (P1) (+L157/L131)
M159: (P1) (+M157/M131)
N159: (P1) (+N157/N131)
O159: (P1) (+O157/O131)
P159: (P1) (+P157/P131)
A161: 'CASH FLOW AFTER ADJUSTMENT
B161: (C2) -1*(+B138*B157)
C161: (C2) -1*(+C138*C157)
D161: (C2) -1*(+D138*D157)
E161: (C2) -1*(+E138*E157)
F161: (C2) -1*(+F138*F157)
G161: (C2) -1*(+G138*G157)
H161: (C2) -1*(+H138*H157)
I161: (C2) -1*(+I138*I157)
J161: (C2) -1*(+J138*J157)
K161: (C2) -1*(+K138*K157)
L161: (C2) -1*(+L138*L157)
M161: (C2) -1*(+M138*M157)
N161: (C2) -1*(+N138*N157)

Q161: (C2) -1*(+Q138*Q157)
 P161: (C2) -1*(+P138*P157)
 A162: 'FROM CHANGE IN PROD QUANTITY
 A164: \-
 B164: \-
 C164: \-
 D164: \-
 E164: \-
 F164: \-
 G164: \-
 H164: \-
 I164: \-
 J164: \-
 K164: \-
 L164: \-
 M164: \-
 N164: \-
 O164: \-
 P164: \-
 A165: 'ADJUSTMENT FOR CHANGES IN
 A166: 'QUALITY OR VALUE ADDED
 B168: "YEAR 1
 C168: "YEAR 2
 D168: "YEAR 3
 E168: "YEAR 4
 F168: "YEAR 5
 G168: "YEAR 6
 H168: "YEAR 7
 I168: "YEAR 8
 J168: "YEAR 9
 K168: "YEAR 10
 L168: "YEAR 11
 M168: "YEAR 12
 N168: "YEAR 13
 O168: "YEAR 14
 P168: "YEAR 15
 A170: 'CHANGE IN VALUE ADDED PER
 A171: 'UNIT AT THE WORK STATION
 A172: 'UNDER NEW METHOD
 A174: 'CASH FLOW IMPACT OF VAL ADDED
 B174: (C2) +B170*B138
 C174: (C2) +C170*C138
 D174: (C2) +D170*D138
 E174: (C2) +E170*E138
 F174: (C2) +F170*F138
 G174: (C2) +G170*G138
 H174: (C2) +H170*H138
 I174: (C2) +I170*I138
 J174: (C2) +J170*J138
 K174: (C2) +K170*K138

L174: (C2) +L170*L138
 M174: (C2) +M170*M138
 N174: (C2) +N170*N138
 O174: (C2) +O170*O138
 P174: (C2) +P170*P138
 A176: 'CASH FLOW, VAL ADDED ADJUSTED
 B176: (C1) +B174+B161
 C176: (C1) +C174+C161
 D176: (C1) +D174+D161
 E176: (C1) +E174+E161
 F176: (C1) +F174+F161
 G176: (C1) +G174+G161
 H176: (C1) +H174+H161
 I176: (C1) +I174+I161
 J176: (C1) +J174+J161
 K176: (C1) +K174+K161
 L176: (C1) +L174+L161
 M176: (C1) +M174+M161
 N176: (C1) +N174+N161
 O176: (C1) +O174+O161
 P176: (C1) +P174+P161
 A178: 'CUM CASH FLOW, VAL ADD ADJUSTED
 B178: (C1) +B176
 C178: (C1) @SUM(B178,C176)
 D178: (C1) @SUM(C178,D176)
 E178: (C1) @SUM(D178,E176)
 F178: (C1) @SUM(E178,F176)
 G178: (C1) @SUM(F178,G176)
 H178: (C1) @SUM(G178,H176)
 I178: (C1) @SUM(H178,I176)
 J178: (C1) @SUM(I178,J176)
 K178: (C1) @SUM(J178,K176)
 L178: (C1) @SUM(K178,L176)
 M178: (C1) @SUM(L178,M176)
 N178: (C1) @SUM(M178,N176)
 O178: (C1) @SUM(N178,O176)
 P178: (C1) @SUM(O178,P176)
 A179: \-
 B179: \-
 C179: \-
 D179: \-
 E179: \-
 F179: \-
 G179: \-
 H179: \-
 I179: \-
 J179: \-
 K179: \-
 L179: \-
 M179: \-

N179: \-
 O179: \-
 P179: \-
 A181: 'INTERNAL RATE OF RETURN
 B181: (F2) @IRR(0.4,B176..P176)
 A183: 'DISCOUNT RATE =
 B183: (F2) 0.2
 A185: 'NPV OF INVESTMENT
 B185: (C2) @NPV(B183,B176..P176)
 A187: \-
 B187: \-
 C187: \-
 D187: \-
 E187: \-
 F187: \-
 G187: \-
 H187: \-
 I187: \-
 J187: \-
 K187: \-
 L187: \-
 M187: \-
 N187: \-
 O187: \-
 P187: \-
 B189: "YEAR 1
 C189: "YEAR 2
 D189: "YEAR 3
 E189: "YEAR 4
 F189: "YEAR 5
 G189: "YEAR 6
 H189: "YEAR 7
 I189: "YEAR 8
 J189: "YEAR 9
 K189: "YEAR 10
 L189: "YEAR 11
 M189: "YEAR 12
 N189: "YEAR 13
 O189: "YEAR 14
 P189: "YEAR 15
 A191: 'DISCOUNTED CASH FLOW
 B191: (C2) @EXP(-B183*1)*B176
 C191: (C2) @EXP(-B183*2)*C176
 D191: (C2) @EXP(-B183*3)*D176
 E191: (C2) @EXP(-B183*4)*E176
 F191: (C2) @EXP(-B183*5)*F176
 G191: (C2) @EXP(-B183*6)*G176
 H191: (C2) @EXP(-B183*7)*H176
 I191: (C2) @EXP(-B183*8)*I176
 J191: (C2) @EXP(-B183*9)*J176

K191: (C2) @EXP(-B183*10)*K176
 L191: (C2) @EXP(-B183*11)*L176
 M191: (C2) @EXP(-B183*12)*M176
 N191: (C2) @EXP(-B183*13)*N176
 O191: (C2) @EXP(-B183*14)*O176
 P191: (C2) @EXP(-B183*15)*P176
 A192: '(CONTINUOUS DISCOUNTING)
 A194: 'DISCOUNTED CUM. CASH FLOW
 B194: (C2) +B191
 C194: (C2) +B194+C191
 D194: (C2) +C194+D191
 E194: (C2) +D194+E191
 F194: (C2) +E194+F191
 G194: (C2) +F194+G191
 H194: (C2) +G194+H191
 I194: (C2) +H194+I191
 J194: (C2) +I194+J191
 K194: (C2) +J194+K191
 L194: (C2) +K194+L191
 M194: (C2) +L194+M191
 N194: (C2) +M194+N191
 O194: (C2) +N194+O191
 P194: (C2) +O194+P191
 A196: \-
 B196: \-
 C196: \-
 D196: \-
 E196: \-
 F196: \-
 G196: \-
 H196: \-
 I196: \-
 J196: \-
 K196: \-
 L196: \-
 M196: \-
 N196: \-
 O196: \-
 P196: \-
 A197: 'AFTER TAX ANALYSIS
 A200: 'COMPUTATION OF DEPRECIATION, INVESTMENT TAX CREDITS, & TAX SAVING
 A202: 'INVESTMENT IN DEPRECIABLE
 B202: "OLD METHOD
 C202: "OLD METHOD
 D202: "OLD METHOD
 E202: "OLD METHOD
 F202: "OLD METHOD
 G202: "OLD METHOD
 H202: "OLD METHOD
 I202: "OLD METHOD

I217: 0.1*I208
 J217: 0.1*J208
 K217: 0.1*K208
 L217: 0.1*L208
 M217: 0.1*M208
 N217: 0.1*N208
 O217: 0.1*O208
 P217: 0.1*P208
 A219: 'TOT FED INVESTMENT TAX CREDIT
 B219: (C2) @SUM(B217..B214)
 C219: (C2) @SUM(C217..C214)
 D219: (C2) @SUM(D217..D214)
 E219: (C2) @SUM(E217..E214)
 F219: (C2) @SUM(F217..F214)
 G219: (C2) @SUM(G217..G214)
 H219: (C2) @SUM(H217..H214)
 I219: (C2) @SUM(I217..I214)
 J219: (C2) @SUM(J217..J214)
 K219: (C2) @SUM(K217..K214)
 L219: (C2) @SUM(L217..L214)
 M219: (C2) @SUM(M217..M214)
 N219: (C2) @SUM(N217..N214)
 O219: (C2) @SUM(O217..O214)
 P219: (C2) @SUM(P217..P214)
 A221: 'DEPRECIATION 1ST YR BASIS
 A223: '3 Yr Property
 B223: (+B205-(B214/2))
 C223: (+C205-(C214/2))
 D223: (+D205-(D214/2))
 E223: (+E205-(E214/2))
 F223: (+F205-(F214/2))
 G223: (+G205-(G214/2))
 H223: (+H205-(H214/2))
 I223: (+I205-(I214/2))
 J223: (+J205-(J214/2))
 K223: (+K205-(K214/2))
 L223: (+L205-(L214/2))
 M223: (+M205-(M214/2))
 N223: (+N205-(N214/2))
 O223: (+O205-(O214/2))
 P223: (+P205-(P214/2))
 A224: '5 Yr Property
 B224: (+B206-(B215/2))
 C224: (+C206-(C215/2))
 D224: (+D206-(D215/2))
 E224: (+E206-(E215/2))
 F224: (+F206-(F215/2))
 G224: (+G206-(G215/2))
 H224: (+H206-(H215/2))
 I224: (+I206-(I215/2))

J224: (+J206-(J215/2))
 K224: (+K206-(K215/2))
 L224: (+L206-(L215/2))
 M224: (+M206-(M215/2))
 N224: (+N206-(N215/2))
 O224: (+O206-(O215/2))
 P224: (+P206-(P215/2))
 A225: '10 Yr Property
 B225: (+B207-(B216/2))
 C225: (+C207-(C216/2))
 D225: (+D207-(D216/2))
 E225: (+E207-(E216/2))
 F225: (+F207-(F216/2))
 G225: (+G207-(G216/2))
 H225: (+H207-(H216/2))
 I225: (+I207-(I216/2))
 J225: (+J207-(J216/2))
 K225: (+K207-(K216/2))
 L225: (+L207-(L216/2))
 M225: (+M207-(M216/2))
 N225: (+N207-(N216/2))
 O225: (+O207-(O216/2))
 P225: (+P207-(P216/2))
 A226: '15 Yr Property
 B226: (+B208-(B217/2))
 C226: (+C208-(C217/2))
 D226: (+D208-(D217/2))
 E226: (+E208-(E217/2))
 F226: (+F208-(F217/2))
 G226: (+G208-(G217/2))
 H226: (+H208-(H217/2))
 I226: (+I208-(I217/2))
 J226: (+J208-(J217/2))
 K226: (+K208-(K217/2))
 L226: (+L208-(L217/2))
 M226: (+M208-(M217/2))
 N226: (+N208-(N217/2))
 O226: (+O208-(O217/2))
 P226: (+P208-(P217/2))
 A228: 'COMPUTE ANNUAL DEPRECIATION:
 A230: '3 Yr Property
 B230: $0.25*B223$
 C230: $0.25*C223+(B223*0.38)$
 D230: $0.25*D223+(C223*0.38)+(0.37*B223)$
 E230: $0.25*E223+(D223*0.38)+(0.37*C223)$
 F230: $0.25*F223+(E223*0.38)+(0.37*D223)$
 G230: $0.25*G223+(F223*0.38)+(0.37*E223)$
 H230: $0.25*H223+(G223*0.38)+(0.37*F223)$
 I230: $0.25*I223+(H223*0.38)+(0.37*G223)$
 J230: $0.25*J223+(I223*0.38)+(0.37*H223)$

K230: $0.25 * K223 + (J223 * 0.38) + (0.37 * J223)$
 L230: $0.25 * L223 + (K223 * 0.38) + (0.37 * J223)$
 M230: $0.25 * M223 + (L223 * 0.38) + (0.37 * K223)$
 N230: $0.25 * N223 + (M223 * 0.38) + (0.37 * L223)$
 O230: $0.25 * O223 + (N223 * 0.38) + (0.37 * M223)$
 P230: $0.25 * P223 + (O223 * 0.38) + (0.37 * N223)$
 A231: '5 Yr Property
 B231: $0.15 * B224$
 C231: $0.15 * C224 + (B224 * 0.22)$
 D231: $0.15 * D224 + (C224 * 0.22) + (0.21 * B224)$
 E231: $0.15 * E224 + (D224 * 0.22) + (0.21 * C224) + (0.21 * B224)$
 F231: $0.15 * F224 + (E224 * 0.22) + (0.21 * D224) + (0.21 * C224) + (0.21 * B224)$
 G231: $0.15 * G224 + (F224 * 0.22) + (0.21 * E224) + (0.21 * D224) + (0.21 * C224)$
 H231: $0.15 * H224 + (G224 * 0.22) + (0.21 * F224) + (0.21 * E224) + (0.21 * D224)$
 I231: $0.15 * I224 + (H224 * 0.22) + (0.21 * G224) + (0.21 * F224) + (0.21 * E224)$
 J231: $0.15 * J224 + (I224 * 0.22) + (0.21 * H224) + (0.21 * G224) + (0.21 * F224)$
 K231: $0.15 * K224 + (J224 * 0.22) + (0.21 * I224) + (0.21 * H224) + (0.21 * G224)$
 L231: $0.15 * L224 + (K224 * 0.22) + (0.21 * J224) + (0.21 * I224) + (0.21 * H224)$
 M231: $0.15 * M224 + (L224 * 0.22) + (0.21 * K224) + (0.21 * J224) + (0.21 * I224)$
 N231: $0.15 * N224 + (M224 * 0.22) + (0.21 * L224) + (0.21 * K224) + (0.21 * J224)$
 O231: $0.15 * O224 + (N224 * 0.22) + (0.21 * M224) + (0.21 * L224) + (0.21 * K224)$
 P231: $0.15 * P224 + (O224 * 0.22) + (0.21 * N224) + (0.21 * M224) + (0.21 * L224)$
 A232: '10 Yr Property
 B232: $0.08 * B225$
 C232: $0.08 * C225 + (0.14 * B225)$
 D232: $0.08 * D225 + (0.14 * C225) + (0.12 * B225)$
 E232: $0.08 * E225 + (0.14 * D225) + (0.12 * C225) + (0.1 * B225)$
 F232: $0.08 * F225 + (0.14 * E225) + (0.12 * D225) + (0.1 * C225) + (0.1 * B225)$
 G232: $0.08 * G225 + (0.14 * F225) + (0.12 * E225) + (0.1 * D225) + (0.1 * C225) + (0.1 * B225)$
 H232: $0.08 * H225 + (0.14 * G225) + (0.12 * F225) + (0.1 * E225) + (0.1 * D225) + (0.1 * C225)$
 I232: $0.08 * I225 + (0.14 * H225) + (0.12 * G225) + ((D225 + E225 + F225) * 0.1) + (0.09 * (B225 + C225))$
 J232: $0.08 * J225 + (0.14 * I225) + (0.12 * H225) + (0.1 * (E225 + F225 + G225)) + (0.09 * (B225 + C225 + D225))$
 K232: $0.08 * K225 + (0.14 * J225) + (0.12 * I225) + (0.1 * (F225 + G225 + H225)) + (0.09 * (B225 + C225 + D225 + E225))$
 L232: $0.08 * L225 + (0.14 * K225) + (0.12 * J225) + (0.1 * (G225 + H225 + I225)) + (0.09 * (C225 + D225 + E225 + F225))$
 M232: $0.08 * M225 + (0.14 * L225) + (0.12 * K225) + (0.1 * (H225 + I225 + J225)) + (0.09 * (D225 + E225 + F225 + G225))$
 N232: $0.08 * N225 + (0.14 * M225) + (0.12 * L225) + (0.1 * (I225 + J225 + K225)) + (0.09 * (E225 + F225 + G225 + H225))$
 O232: $0.08 * O225 + (0.14 * N225) + (0.12 * M225) + (0.1 * (J225 + K225 + L225)) + (0.09 * (F225 + G225 + H225 + I225))$
 P232: $0.08 * P225 + (0.14 * O225) + (0.12 * N225) + (0.1 * (K225 + L225 + M225)) + (0.09 * (G225 + H225 + I225 + J225))$
 A233: '15 Yr Property
 B233: $0.12 * B226$
 C233: $0.1 * B226 + (0.12 * C226)$
 D233: $0.09 * B226 + (0.1 * C226) + (0.12 * D226)$
 E233: $0.08 * B226 + (0.09 * C226) + (0.1 * D226)$
 F233: $0.07 * B226 + (0.08 * C226) + (0.09 * D226)$
 G233: $0.06 * B226 + (0.07 * C226) + (0.08 * D226)$
 H233: $0.06 * B226 + (0.06 * C226) + (0.07 * D226)$
 I233: $0.06 * (B226 + C226 + D226)$
 J233: $0.06 * (B226 + C226 + D226)$
 K233: $(0.05 * B226) + (0.06 * (C226 + D226))$
 L233: $(0.05 * (B226 + C226)) + (0.06 * D226)$

```

M233: 0.05*(B226+C226+D226)
N233: 0.05*(B226+C226+D226)
O233: 0.05*(B226+C226+D226)
P233: 0.05*(B226+C226+D226)
M235: (C2) @SUM(M233..M230)
N235: (C2) @SUM(N233..N230)
O235: (C2) @SUM(O233..O230)
P235: (C2) @SUM(P233..P230)
M237: (C2) 0.46*(M235+(M155*M235))
N237: (C2) 0.46*(N235+(N155*N235))
O237: (C2) 0.46*(O235+(O155*O235))
P237: (C2) 0.46*(P235+(P155*P235))
M239: (C2) 0.46*((M41-M210)+(M155*(M41-M210)))
N239: (C2) 0.46*((N41-N210)+(N155*(N41-N210)))
O239: (C2) 0.46*((O41-O210)+(O155*(O41-O210)))
P239: (C2) 0.46*((P41-P210)+(P155*(P41-P210)))
M241: \-
N241: \-
O241: \-
P241: \-
M242: "OLD METHOD
N242: "OLD METHOD
O242: "OLD METHOD
P242: "OLD METHOD
M243: "YEAR 12
N243: "YEAR 13
O243: "YEAR 14
P243: "YEAR 15
M247: \-
N247: \-
O247: \-
P247: \-
M249: "NEW METHOD
N249: "NEW METHOD
O249: "NEW METHOD
P249: "NEW METHOD
M250: "YEAR 12
N250: "YEAR 13
O250: "YEAR 14
P250: "YEAR 15
M257: (C2) @SUM(M252..M255)
N257: (C2) @SUM(N252..N255)
O257: (C2) @SUM(O252..O255)
P257: (C2) @SUM(P252..P255)
M261: 0.06*M252

```

N261: 0.06*N252
 O261: 0.06*O252
 P261: 0.06*P252
 M262: 0.1*M253
 N262: 0.1*N253
 O262: 0.1*O253
 P262: 0.1*P253
 M263: 0.1*M254
 N263: 0.1*N254
 O263: 0.1*O254
 P263: 0.1*P254
 M264: 0.1*M255
 N264: 0.1*N255
 O264: 0.1*O255
 P264: 0.1*P255
 M266: (C2) @SUM(M264..M261)
 N266: (C2) @SUM(N264..N261)
 O266: (C2) @SUM(O264..O261)
 P266: (C2) @SUM(P264..P261)
 M270: (+M252-(M261/2))
 N270: (+N252-(N261/2))
 O270: (+O252-(O261/2))
 P270: (+P252-(P261/2))
 M271: (+M253-(M262/2))
 N271: (+N253-(N262/2))
 O271: (+O253-(O262/2))
 P271: (+P253-(P262/2))
 M272: (+M254-(M263/2))
 N272: (+N254-(N263/2))
 O272: (+O254-(O263/2))
 P272: (+P254-(P263/2))
 M273: (+M255-(M264/2))
 N273: (+N255-(N264/2))
 O273: (+O255-(O264/2))
 P273: (+P255-(P264/2))
 M277: 0.25*M270+(L270*0.38)+(0.37*K270)
 N277: 0.25*N270+(M270*0.38)+(0.37*L270)
 O277: 0.25*O270+(N270*0.38)+(0.37*M270)
 P277: 0.25*P270+(O270*0.38)+(0.37*N270)
 M278: 0.15*M271+(L271*0.22)+(0.21*K271)+(0.21*J271)+(0.21*I271)
 N278: 0.15*N271+(M271*0.22)+(0.21*L271)+(0.21*K271)+(0.21*J271)
 O278: 0.15*O271+(N271*0.22)+(0.21*M271)+(0.21*L271)+(0.21*K271)
 P278: 0.15*P271+(O271*0.22)+(0.21*N271)+(0.21*M271)+(0.21*L271)
 M279: 0.08*M272+(0.14*L272)+(0.12*K272)+(0.1*(H272+I272+J272))+(0.09*(D272+E272+F272+G272))
 N279: 0.08*N272+(0.14*M272)+(0.12*L272)+(0.1*(I272+J272+K272))+(0.09*(E272+F272+G272+H272))
 O279: 0.08*O272+(0.14*N272)+(0.12*M272)+(0.1*(J272+K272+L272))+(0.09*(F272+G272+H272+I272))
 P279: 0.08*P272+(0.14*O272)+(0.12*N272)+(0.1*(K272+L272+M272))+(0.09*(G272+H272+I272+J272))
 M280: 0.05*(B273+C273+D273)
 N280: 0.05*(B273+C273+D273)
 O280: 0.05*(B273+C273+D273)

P280: $0.05 * (B273 + C273 + D273)$
 M282: (C2) @SUM(M280..M277)
 N282: (C2) @SUM(N280..N277)
 O282: (C2) @SUM(O280..O277)
 P282: (C2) @SUM(P280..P277)
 M284: (C2) $0.46 * M282$
 N284: (C2) $0.46 * N282$
 O284: (C2) $0.46 * O282$
 P284: (C2) $0.46 * P282$
 M286: (C2) $0.46 * (M78 - M257)$
 N286: (C2) $0.46 * (N78 - N257)$
 O286: (C2) $0.46 * (O78 - O257)$
 P286: (C2) $0.46 * (P78 - P257)$
 M289: \-
 N289: \-
 O289: \-
 P289: \-
 M290: "NEW METHOD
 N290: "NEW METHOD
 O290: "NEW METHOD
 P290: "NEW METHOD
 M291: "YEAR 12
 N291: "YEAR 13
 O291: "YEAR 14
 P291: "YEAR 15
 M295: \-
 N295: \-
 O295: \-
 P295: \-
 M298: "YEAR 12
 N298: "YEAR 13
 O298: "YEAR 14
 P298: "YEAR 15
 M300: (C2) +M176
 N300: (C2) +N176
 O300: (C2) +O176
 P300: (C2) +P176
 M305: (C2) +M286-M239
 N305: (C2) +N286-N239
 O305: (C2) +O286-O239
 P305: (C2) +P286-P239
 M307: (C2) (M266-M219)
 N307: (C2) (N266-N219)
 O307: (C2) (O266-O219)
 P307: (C2) (P266-P219)
 M309: (C2) (+M284-M237)
 N309: (C2) (+N284-N237)
 O309: (C2) (+O284-O237)
 P309: (C2) (+P284-P237)
 M311: (C2) +M245-M293

N311: (C2) +M245-N293
 O311: (C2) +O245-O293
 P311: (C2) +P245-P293
 M313: (C2) +M300+M305+M307+M309+M311
 N313: (C2) +N300+N305+N307+N309+N311
 O313: (C2) +O300+O305+O307+O309+O311
 P313: (C2) +P300+P305+P307+P309+P311
 M315: (C2) +L315+M313
 N315: (C2) +M315+N313
 O315: (C2) +N315+O313
 P315: (C2) +O315+P313
 M326: "YEAR 12
 N326: "YEAR 13
 O326: "YEAR 14
 P326: "YEAR 15
 M328: (C2) @EXP(-B324*12)*M313
 N328: (C2) @EXP(-B324*13)*N313
 O328: (C2) @EXP(-B324*14)*O313
 P328: (C2) @EXP(-B324*15)*P313
 M331: (C2) +L331+M328
 N331: (C2) +M331+N328
 O331: (C2) +N331+O328
 P331: (C2) +O331+P328

A332: FLOW. AFTER TAX, CONT DISC
 A334: INTERNAL RATE OF RETURN
 E334: (F3) @IRR(0.4,B328..P328)
 A335: "(AFTER TAX), DISCOUNTED)

Appendix C

Test Plan

Appendix C

ROBOTICS INVESTMENT DECISION MODEL (RIDM) - PRELIMINARY DATA GATHERING PLAN (Test Plan for Phase III)

1. Phase III will test RIDM for its accuracy, adequacy, and ease of use.

a. Accuracy

(1) The accuracy of the model will be tested by running a test case which exercises all the options, and all formulas and cell references. The intermediate and final results of the model run will be checked against the analysis results as calculated by hand.

b. Adequacy

(1) We believe the model as it exists after Phase II development contains all essential analyses and outputs. However, this will be validated.

(2) A number of "like-to-have" features will be explored. Those features that are found to be especially useful, and which can be readily included, will be added to the model. Extra features to be explored include:

(a) Capability to address probabilities of future events, particularly the probability of longer term utilization of the robotic/FMS equipment.

(b) A feature to enable the quantity and value added adjustments to consider each manufactured item separately, and not just in terms of gross throughput as it presently operates.

(c) The provision of a "balance sheet impact" output, which would show the impact of the investment on the company financial statements, for each year of the analysis period.

c. Ease of use

(1) The following possible additions will be considered to make the model easier to use:

(a) Automatic "pull down" of the depreciation schedule from the input section.

(b) Building in special studies, such as on costs (e.g. total labor cost, total equipment cost, or cost ratios) or outputs (e.g. performance, performance ratios).

(c) Providing white background to designate the inputs.

(d) Referencing all or some variables by range names instead of cell references.

(e) Using Macros to designate the analysis period, and the selection of options.

2. The users manual will be evaluated for clarity and completeness.

3.. The information for model validation will be obtained through discussions with financial staff at several of the companies surveyed during Phase I. Most contact will be by telephone, but at least one site visit will be made for hands-on field testing. The draft model will be sent to the reviewing companies as soon as approval for Phase III is obtained.

