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APTUS

Aptus, Inc.
a subsidiary of Rollins Environmental Services, Inc.

P.O. Box 1328
Coffeyville, KS 67337
(316) 251-6380 337

February 29, 1996

EA 96-013

Mr. W. A. Spratlin
EPA Region VII
726 Minnesota Ave.
Kansas City, Kansas 66101

RECEIVED MAR - 5 1996

RE: Project XL Proposal, Aptus, Inc. Permit KSD# 981 506 025

Dear Mr. Spratlin:

The purpose of this letter is to submit the enclosed Project XL program description that we discussed on January 24, 1996, for the Aptus, Inc. Incinerator in Coffeyville, Kansas. Rollins and it's subsidiary Aptus, Inc. request your review on a shortened time frame, due to the trial burn planning and preparation efforts that are underway. Since this proposal contemplates significant re-engineering of our air pollution control system, we request that the requirement for a trial burn be re-scheduled until April, 1998 to accommodate skakedown of the new carbon injection system which will be completed by then. In addition, installation on the carbon injection system will reduce dioxin emissions to levels below the standard contemplated in the proposed Hazardous Waste Combustion Rule obviating a need to conduct an Indirect Risk Assessment for the Coffeyville facility. The actions contemplated under this Project XL proposal coupled with the world class particulate and metal removal systems currently installed at Coffeyville will make our facility among the lowest emitters of pollution in the world.

EPA's acceptance of this Project will require an extension of our TSCA incinerator permit. As you begin your review of this proposal, we will make it our top priority to answer your questions, meet with you and KDHE as necessary, and cooperate to the fullest extent. Since the citizens of Coffeyville are our partners throughout this project, an extensive public participation effort will be launched along with this XL project, to brief our neighbors about the positive aspects of these pollution control enhancements. We will coordinate our efforts with the State of Kansas and the United States Environmental Protection Agency.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the information, the information submitted is, to the best of my knowledge, and belief, true, accurate, and complete. I am aware that there are significant penalties for

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submitting false information, including the possibility of fine and imprisonment for knowing violations.

If you have any questions regarding this proposal and permit modification, please call me at 316-252-1202 or Peter Hanley at 316-252-1396, in Coffeyville, Kansas.

Sincerely,

Ronald W. Garner
Vice President and General Manager

CC: John Mitchell, KDHE

PROJECT XL APPLICATION FOR THE APTUS, INC. INCINERATOR IN COFFEYVILLE, KANSAS

Background: Aptus Inc. Incinerator Permit

Aptus, Inc. (Aptus), a Rollins Environmental Services, Inc. subsidiary, operates an incinerator near Coffeyville, Kansas, that was built in 1985. Aptus began burning PCB wastes in 1986 after performing a trial burn demonstrating a 99.9999% (six nines) Destruction and Removal Efficiency, and satisfying all other applicable requirements of the Toxic Substances Control Act. In 1991 Aptus was also granted a RCRA permit for the incineration of hazardous wastes, after a trial burn was successfully demonstrated and all applicable RCRA requirements were satisfied. Each of these permits was issued to Aptus with conditions of approval, including term limits for the permits. The Aptus permit number and EPA identification number is KSD981506025, for both the RCRA and TSCA permits.

The TSCA permit which was issued July 31, 1986, has a ten year life, and expires on July 31, 1996. EPA Region VII was notified of our intent to renew the TSCA incinerator permit on January 11, 1996. The TSCA regulations do not specifically require a trial burn for EPA to re-issue the permit. The RCRA permit was issued by the Kansas Department of Health and Environment (KDHE) on July 27, 1991 and expires on July 26, 2001. The RCRA permit specifies that Aptus is required to conduct testing under 40 CFR 264.347(a)(3) to verify that the performance standards are being met, at no less than five year intervals. Thus Aptus must perform a trial burn in approximately mid May 1996, to allow analytical testing and report writing efforts to be completed for submittal prior to July 27, 1996.

Maximum Achievable Control Technology (MACT)

As trial burn arrangements are being made, Aptus is also anticipating that EPA will formally propose MACT numerical air emission standards late in the first quarter of calendar year 1996. These final MACT standards for hazardous waste combustors will likely not be required to be met by those combustors until 1999. Based on our current understanding of what the MACT standards will be, Aptus may already meet these emission standards in all categories except for 1) dioxins/furans - simply referred to as dioxin from this point - and 2) mercury. Preliminary research and field studies indicate that Aptus could meet the dioxin and mercury emission standards with the installation of a carbon injection unit and recirculating brine loop filtering system to remove carbon from the scrubber brine.

On November 7, 1995, Aptus began initial testing of carbon injection to determine

the most effective and optimum locations in the gas cleaning train for carbon to be injected. Authority to begin this initiative was approved by EPA Region VII (ARTD) and by the Kansas Department of Health and Environment. The mechanism for approval of the effort was a 180 day temporary authorization that will expire on May 6, 1996. The temporary authorization was granted by the Kansas Department of Health and Environment, under provisions of 40 CFR 270.42(e)(3)(ii)(E).

Project XL

Aptus, Inc. hereby proposes to EPA and KDHE that in exchange for making the capital improvements necessary to meet the maximum achievable control technology standards for hazardous waste combustors more than a year in advance, that Aptus be granted a delay in the scheduled trial burn. This will allow full development of the carbon system and its performance to be reflected in the trial burn results. Furthermore, Aptus proposes that all obligations to perform Indirect Risk Assessment on the facility be dropped, as being unnecessary, upon demonstration of maximum achievable control technology compliance.

Under the RCRA definition of a class 3 permit modification, and under the Project XL program description, public participation will be an element of the Agencies' granting this request. Aptus recognizes the importance of keeping our community informed of our activities, and believes that an informal public information meeting followed by a formal public meeting would be appropriate. What follows in this application is a technical discussion of this proposal.

In preliminary discussions with EPA Region VII and KDHE management, Aptus recognized that there will possibly be a need to reach a three party agreement specifying the terms and conditions of the Project XL agreement. In addition, KDHE may need to treat this as a class three permit modification, to satisfy administrative requirements. Aptus makes this submittal to initiate the review and approval process. Any other agreements that may be required as a result of this application can begin in parallel to the review process of this application.

Technical Background

Rollins Environmental Services Inc. operates seven incinerators, with gas cleaning trains (GCT), at five sites around the United States. Four of the gas cleaning trains are of the wet variety, where the initial "quick quench" virtually prevents de novo synthesis of dioxin in the combustion gas. The other two units, including Aptus- Coffeyville (henceforth

KS) are "dry/wet". They have wet scrubbers, preceded by spray dryer/baghouse unit operations. A process flow diagram for the KS gas cleaning train is attached. This dry wet system was selected to achieve state-of-the-art metals removal efficiencies, and Aptus will likely be one of the facilities included in the metals MACT floor. However this allows increased residence time of the gas within the dioxin synthesis temperature window compared to a quick quench design. The synthesized (as opposed to PIC or non-combusted) dioxins are key to both risk assessment and compliance with future MACT standards for incinerators.

A plan has been developed to reduce dioxin emissions from the KS incinerator. The plan is somewhat developmental, since no proven economical technology is ready for immediate delivery. This plan builds on previous experience and is intended to keep total capital cost below $2MM per plant. We believe we can have the system in full service in KS by April 1998.

The present KS dioxin emission averages 2.19 nano-grams/dscm TEQ, compared to the proposed MACT limit of 0.2 TEQ. A reduction of over 90% will be mandated by implementation of the new maximum achievable control technology standards. Aptus (UT) has a similar emission level. Rollins proposes to be proactive in achieving compliance with MACT.

A major study of the wet scrubber plants has been performed to identify MACT problems and solutions, with publication of results. This study was performed jointly with the EPA-OSW in the wet gas cleaning train at the RES(NJ) facility in 1995 with follow-up studies continuing. The preliminary conclusion of this study was that, to meet anticipated MACT limits, the wet gas cleaning trains would require only the addition of a single new unit operation. Rollins has initiated development work in Kansas unilaterally with similar quantification goals, and a more ambitious installation schedule.

Recent Plant Experience

In 1994, Aptus (KS) tested carbon injection into the baghouse inlet duct (point 1 on the attached flowsheet). This showed little or no reduction in the stack dioxin emission. This was a relatively short test, at low carbon feed rate, with an injection distributor that had not been designed for carbon. It is conceivable that any or all of these were limiting factors, and the test was not sufficient to demonstrate performance. It is also likely that the high baghouse temperature (470°F) allows synthesis of dioxin to continue beyond the bags, and reduces carbon adsorption efficiency.

Utah (UT) performed testing in 1994. Using the greater latitude offered by the plant

design, baghouse temperatures were varied from 380-460°F. The impact of sulfur was also tested. Of a total of six, three dioxin runs were made at elevated sulfur feeds (approximately 0.25 sulfur to chlorine ratio). Each variable showed a 50% reduction in dioxin emission individually, and combined for a nearly 70% reduction from the normal 2 nano-grams TEQ level. These results are promising and consistent with the fundamental theories on dioxin reformation chemistry. Even the best result does not yield the anticipated MACT emission levels emission. While carbon has not yet been tested in Utah, the Kansas work is directly transferrable.

Sulfur addition improved dioxin emissions in Utah, however, sulfur addition is not an economic practice unless the sulfur feed comes in the form of waste. The SO_2 formed must be neutralized, and the salts land filled, both at considerable cost. If sulfur can be fed at consistent rates from the waste streams however, an economic reduction in emissions may be achieved. The sulfuric and sulfurous acid dew points are a key concern regarding corrosion in the system, and must be well understood. Similarly, assessment of the long-term operable spray dryer/baghouse temperatures must be made, particularly for Aptus (KS) with the smaller, more limited spray dryer. The reductions evidenced by the Aptus (UT) testing did not achieve the expected MACT levels.

Carbon injection is reported to be successful in other hazardous waste combustion systems, where more rigorous tests, at various injection points in the system, has been completed. The results of this testing are quite promising but not yet conclusive. Aptus (KS) proposes to continue that testing program through implementation and permanent operation.

A key aspect of carbon injection is mercury removal impact. It is expected that the unit metals removal efficiency for mercury will improve, which is a significant benefit especially with respect to MACT. The fate of the carbon/filter cake removed from the waste water is a significant operating cost driver. This carbon, now a solid waste, will contain the mercury and dioxin removed from the gas stream. Land Disposal Restrictions on these contaminants are rigorous, and could lead to costly disposal options. Treatment of this filter cake may require development of innovative treatment technologies. We will assess this as testing and development proceeds.

Alternatives

Carbon injection is not the only means to achieve maximum achievable control technology standards, but it does appear to be the most economical and best at the dual (dioxin and mercury) goals. The following options have been evaluated:

1. Carbon (tail-end) Treatment - Installation of a carbon bed downstream of the existing gas cleaning train is feasible. This is estimated to have very high capital and operating costs ($4MM, $100K/yr).

2. Replace Spray Dryer - There are several permutations of this idea, all with a goal of allowing the baghouse temperature to be reduced below 350°F. This would require at least $2MM and considerable lead time to execute. Replacement is not an immediate need, however the existing unit is within several years of its useful life. This fact suggests that minimizing the abatement cost now is ideal with potential for further improvement upon spray dryer replacement. This step alone would probably not reach 0.2 TEQ emissions in any event. The acid dew point concern remains even with a rebuilt spray dryer.

3. Eliminate Spray Dryer/Baghouse - Revision of the process to include a quick quench should reduce dioxin emissions to typical wet system levels. This is not a desirable option in many ways. The spray dryer/baghouse system results in outstanding metals removal efficiencies. The metals removal efficiency would be reduced if we eliminated the spray dryer/baghouse. An NPDES permit would be necessary, with no viable receiving water at either KS or UT. Capital cost of at least $3MM would be required. Eliminating the "zero discharge" aspect of the process should be seen as a step backwards in many ways. Alternately, a separate evaporator system to extract salt from the brine is possible, at further capital cost. The evaporator should be evaluated as a long term alternate to replacing the spray dryer only. The wet/wet systems do show better mercury removal but the cost and environmental tradeoffs, along with other shortcomings in meeting MACT, outweigh this.

4. Prescrub HCl - Removing HCl from the gas before it is cooled is a potential solution, reducing a key raw material in the synthesis reaction. Such a technology is unproven in any application, and doubtful in full-scale practice. The available data suggests that this would lead to inefficiencies in alkali usage, significantly increasing the generation of baghouse dust (and operating costs). No mercury impact is expected from this change making it even less attractive.

5. Prevent Synthesis with Sulfur - This idea is based on data from EPA and Utah. Follow up will determine the potential, but this does not appear to be a feasible alternative to achieve expected MACT level for dioxin, and provides no removal of mercury.

Current Plan

Carbon injection has therefore been identified as the most promising technology to pursue. The final resolution of this program, with a goal of final startup in KS in early 1998,

will be made in four phases. A detailed project schedule is attached, but the technical milestones are summarized below. The schedule reflects the realities of the process development, and the dioxin waste market as well.

I. Injection Nozzle Installation (9/95)
followed by preliminary testing(11/95) COMPLETE

II. Carbon Feed System Installation (4/96) (estimate +/- 1 months)
Followed by extended testing (8/96 -11/96) (estimate +/- 2 months)

III. Final Injection Point(s) Testing (3/97 - 5/97) (estimate +/- 3 months)

IV. Water System Modifications (5/97 - 11/97) (estimate +/- 5 months, if
V. Carbon disposal resolution (12/97) necessary)

Phase II has started. Norit Americas, a leading activated carbon supplier, has been selected as the primary vendor providing the feed system described in Phase II.

Phase IV will depend upon successful identification of dioxin reduction locations. The attached process flow diagram is marked with the points being evaluated. Point [1] has shown good removal, but generated dramatic increase of dioxin levels in the solids residue. Evidently, carbon, within the temperature window, acts as a catalyst for dioxin synthesis. Any dioxin thus formed (estimated at 100X what was originally in the gas in the KS test) is adsorbed by the carbon, so gas emission is indeed reduced. Net dioxin "yield", however, is increased. This could significantly impact our ability to meet the LDR for the residues.

Points [4-6] caused difficulties in operating the particulate removal equipment, especially the Ionizing Wet Scrubbers. The particulate removal capabilities of the IWS units were challenged leading to poorer dioxin reductions.

The points downstream of the baghouse are most promising. Given the carbon catalysis evidence, filtration of the water <u>at least</u> as it is fed to the spray dryer will be necessary. The point(s) of carbon injection will dictate the maximum water flow to be treated. This will be better evaluated after the April testing.

Proposal

Aptus, Inc. proposes to expedite MACT compliance, far in advance of effective dates of such new regulations, for the KS facility. Aptus will limit the operation of the incinerator to no more than one year of operation between July 27, 1996 and 4/1/98. This

elevates reducing actual air emissions to a higher priority than redemonstrating another trial burn. Given the facility history and data available on our ability to achieve the requirements of a trial burn, we believe this proposal is reasonable. The key MACT parameters presumed in this proposal are in Table 1.

TABLE 1 - Presumed MACT Standards

Dioxins/Furans	0.20 nano-grams/dscm TEQ
Mercury	30 micro-grams/dscm
Anticipated MACT Compliance Date	12/1/99

The MACT standards are based upon a generic indirect risk assessment (IRA), therefore a site-specific IRA will not be performed. Deferral of the 1996 trial burn will allow the company to focus on completion of the carbon injection system, both technically and financially. The 1998 trial burn will then test a proven system that will be in compliance with the new MACT standards.

Project XL Criteria

1. Environmental Results: Without incurring the cost and time to complete an Indirect Risk Assessment, Aptus can generate permanent emission and risk reduction, instead of a simple paper evaluation of present emissions. Dioxin is likely to be the major source of risk from Aptus Coffeyville. Actually reducing those emissions and subsequent risks is preferable to quantifying risk in minute detail. The trial burn will generate operating data on a state-of-the-art facility, instead of one where modifications are underway or anticipated as being necessary.

2. Cost Savings and Paperwork Reduction: A tremendous paper study will be replaced by a ground-breaking process study, culminating in a cost-optimal, state of the art process change. Aptus will achieve major cost savings in capital expenditure (and O&M costs) from the patient optimization of the process. A second stack test of considerable scope would be required upon finalization of the carbon system, and this cost and paperwork is precluded by the proposal.

3. Stakeholder Support: The state of Kansas Department of Health & Environment has authorized the initial study with a temporary permit, valid for 180 days. Discussions with local authorities, and continuing with KDHE, will be pursued regarding this proposal.

Public meetings and information sessions will be held as well. Aptus has set the standard in the industry for low particulate emission. We have enjoyed a great level of acceptance and support from the local community because of a pro-active and open approach to pollution prevention. Given the numerous trial burns and copious stack test data accumulated over the last ten years, broad acceptance of this proposal is anticipated from the stakeholders.

4. Innovation/Multi-Media Pollution Prevention: Any reduction to dioxin and mercury air emissions will also reduce the effect of those emissions on other environmental media. Dispersion and deposition models show that airborne constituents would be expected to have the maximum point of impact on the Aptus owned field immediately (~400 yards) north of the incinerator. Once contaminants are deposited, surface water can be affected and plant uptake can occur, thereby allowing entry of the contaminants into the broader environment and even the food chain. Thus reduction in air emissions will reduce impact on other environmental media. This phenomenon is a major driver in EPA's setting of the new MACT standards.

5. Transferability: The data developed should be relevant to and useful for many other combustion sources of dioxin (and mercury) emission; municipal waste and medical waste combustors, cement kilns, and even coal fired boilers.

6. Feasibility: Aptus' preliminary data suggests that carbon injection will be successful at reducing emissions. Cost minimization will be the primary focus once this is certain. European experience and early data from U.S. applications also suggest that the proposed work will succeed.

7. Monitoring, Reporting and Evaluation: Reports for public distribution will be readily available to the agency. Stack testing reports and summaries of internal reports can also be provided as negotiated. The use of carbon injection for dioxin and mercury control is not new. The body of data on such applications is poor however, and Aptus has committed to publishing the results of these studies into the public record. Such publication will facilitate these applications in a variety of industries beyond hazardous waste incineration. At each of the four key milestones identified under the "current plan", a formal report will be generated and provided to KDHE, EPA, and stakeholders.

8. Shifting of Risk Burden: The result of this work will be an across the board reduction in risk to any and all affected parties.

PROJECT XL

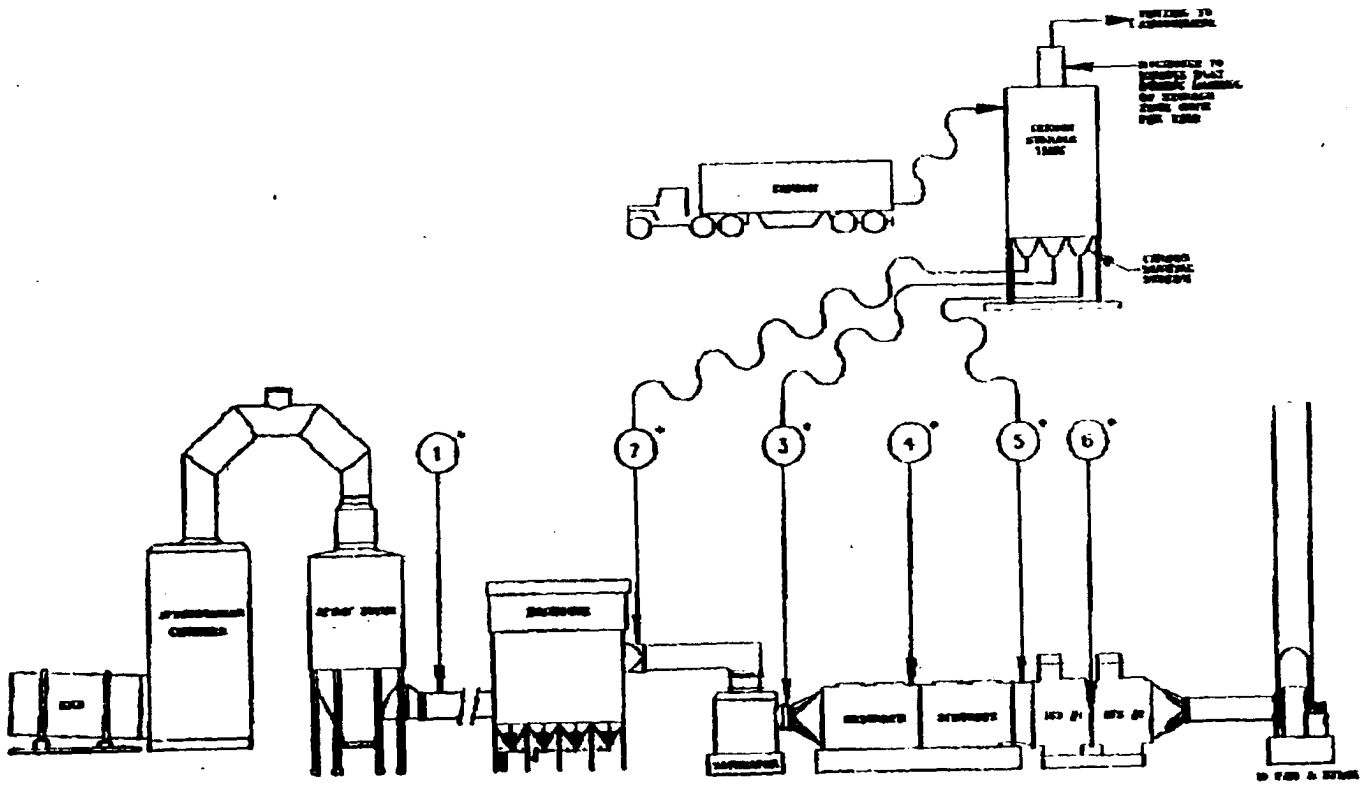


FIGURE 1—INCINERATOR SCHEMATIC DIAGRAM

• —6 POTENTIAL CARBON INJECTION POINTS

REVISIONS					CURRENT DRAWING STATUS		

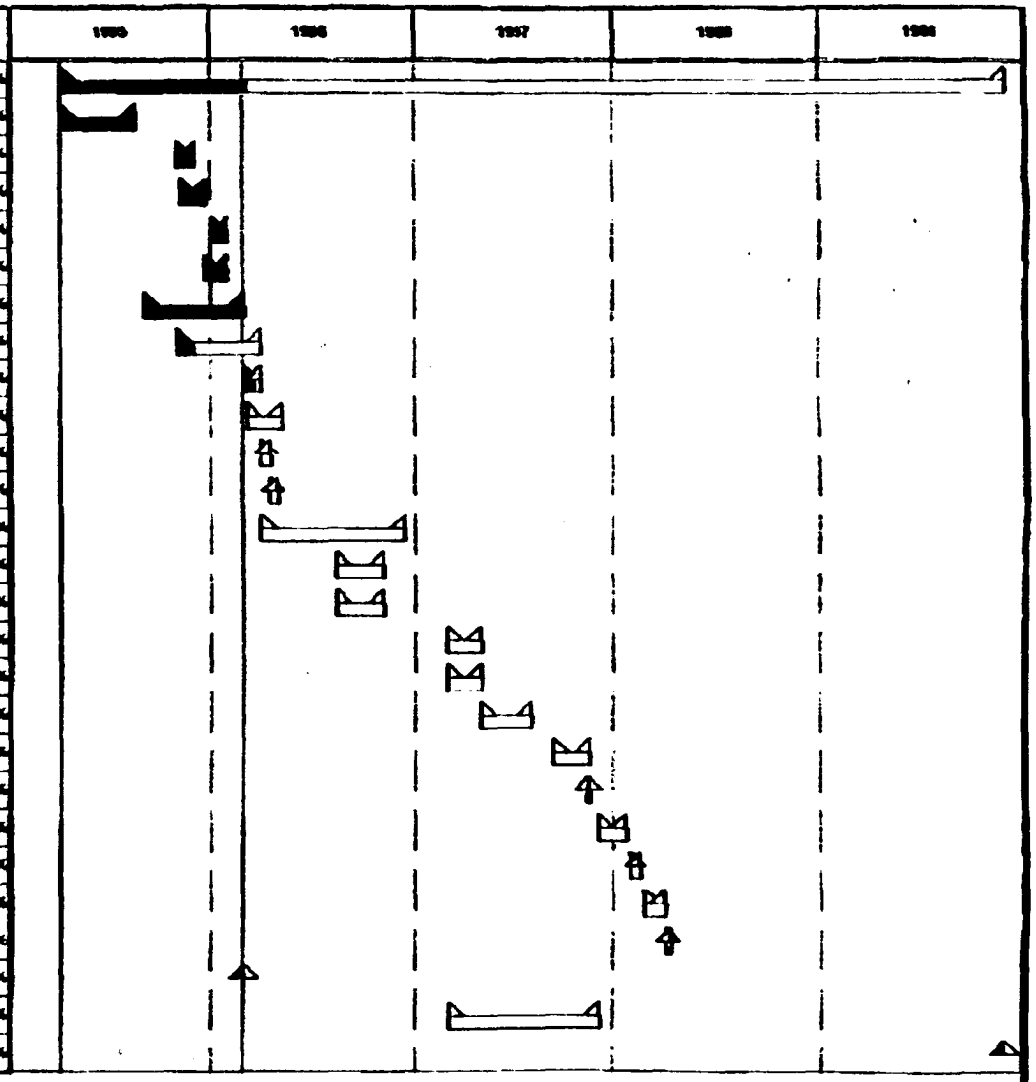
ARTUS

SIMPLIFIED DIAGRAM FOR AIR PERMIT

H-613-1-010

PROJECT XL - MACT/CARBON INJECTION/TRIAL BURN

Task Name	Resource	Start Date	End Date	Percent Complete
Carbon Injection, Trial Burn, and MACT		4/1/95	12/1/99	29%
Preliminary Engineering	Contractor	4/1/95	8/15/95	100%
Install Portable Carbon Injection	Eng. Ops	11/1/95	11/10/95	100%
Initial Test and Analysis	OPS/EA/EM	11/7/95	12/22/95	100%
Data Evaluation	OPS/EA/EM	1/1/96	1/31/96	100%
Redesign Nozzles for Carbon Injection	Engineering	12/20/95	1/31/96	100%
Equipment Manufacture / Delivery	Contractor	1/1/95	2/20/96	100%
Install Opacity Meter and Filter for Spray Dryer	O+S	11/1/95	4/1/96	20%
Install Permanent Carbon Injection Equipment	Engineering	3/1/96	4/15/96	60%
Public Participation on Project XL Approval	Aptus, Inc.	3/1/96	5/1/96	0%
Shakedown Carbon Feed, Inj. Nozzle, effect on RMS	Engineering	4/1/96	4/15/96	0%
First Carbon Injection / Stack Test & Bhse Filter Test	Eng. Ops	4/16/96	5/1/96	0%
Evaluate Effect of Carbon Accumulation on Scrubbing	Eng/EA	4/1/96	12/13/96	0%
Incinerator Campaign	OPS	8/15/96	11/1/96	0%
Secondary Carbon Inj. Test and Bhse Filtration Test	OPS/EA/EM	8/15/96	11/1/96	0%
Incinerator Campaign	OPS	3/1/97	5/1/97	0%
Third Carbon Injection Test and Report	OPS/EA/EM	3/1/97	5/1/97	0%
Final Carbon Injection & Bhse Filter Modifications	Eng. Ops	5/1/97	8/1/97	0%
Final System Adjustments	Eng. Ops	9/15/97	11/17/97	0%
Trial Burn Plan, QAPP Submittal	EA	11/15/97	11/17/97	0%
Public Comment Period for Trial Burn Plan	EPA/KDHE	12/4/97	1/23/98	0%
Address Public Comments on Trial Burn Plan	Aptus, Inc.	1/30/98	2/1/98	0%
Preparation & Mobilization of Trial Burn Actions	Aptus, Inc.	2/25/98	3/31/98	0%
Perform Trial Burn	Aptus, Inc.	4/1/98	4/13/98	0%
Draft MACT Rule Published	EPA	3/1/96	3/1/96	90%
Publish and Adopt Final MACT Rule	EPA	3/3/97	12/5/97	0%
Compliance Date for MACT Rule	EPA	12/1/99	12/1/99	0%



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Milestone ▽ Summary
Fixed Delay Slack