SEPARATOR

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ENSAFE INC. ENVIRONMENTAL AND MANAGEMENT CONSULTANTS

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May 11, 1998

CSN. 54-066
PERMIT NO #
HAZARDOUS WASTE-SORT:
PERMIT/COMPLIANCE/SUPERFUNDS

Enforcement Branch Manager
Hazardous Waste Division
Arkansas Department of Pollution Control
and Ecology
8001 National Drive
Little Rock, Arkansas 72219

Dear Sir:

EnSafe, Inc. (EnSafe) is pleased to submit the following documents on behalf of Cedar Chemical Corporation: (1) Interim Measures Plan of Action; and (2) Risk Assessment Work Plan. The Interim Measures Plan of Action details Cedar Chemical's proposed approach for completing the interim measures discussed in our meeting at ADPC&E on March 19, 1998. The Risk Assessment Work Plan has been revised to reflect comments from ADPC&E including the incorporation of an ecological risk assessment.

If you have any questions concerning these documents please contact Dr. Peter Fields at (870) 572-3701 or me at (901) 372-7962.

Sincerely,

EnSafe, Inc.

Jeff Bennett

By: Jeff Bennett, CHMM
Sr. Project Manager

Enclosures

cc: Dr. Peter Fields, Cedar Chemical Corporation
Mr. Allen Malone, Apperson Crump, Duzane & Maxwell

98R-10321

MAY 1 2 1998

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1.0 INTRODUCTION

At the request of the Arkansas Department of Pollution Control and Ecology (ADPC&E), interim measures are being considered for the Cedar Chemical (Cedar) facility in West Helena, Arkansas. A Facility Investigation (FI) has been completed onsite in accordance with Consent Administrative Order LIS 91-118, and Cedar is currently preparing risk assessment work plans to evaluate threats to human health and local ecology from site contaminants. Once risk assessment has been completed, Cedar will proceed with Corrective Measures Studies (CMS) for the site. Cedar has retained EnSafe Inc. (EnSafe) to perform the risk assessments and CMS.

ADPC&E has required Cedar to accelerate remedial actions with respect to two onsite environmental concerns:

- The 1,2-dichloroethane groundwater source area, in the alluvial aquifer beneath the northeast portion of the property, and

- The drum vault, Site 5, which ADPC&E has identified as a potential source of subsurface contamination.

Remedial responses for these two areas will be removed from the FI and CMS process and evaluated as interim measures. This Plan of Action (POA) discusses the steps necessary to assess interim measures and presents Cedar's time line for implementing interim actions. EnSafe will perform all interim measure evaluations.

This POA discusses the various elements of the interim measures process, including:

- Development of an Interim Measures Work Plan (IMWP) for groundwater

- Development and implementation of a Groundwater Monitoring Plan (GMP)
- Development of an IMWP for Site 5
- Performance of Interim Measures Evaluations (IME)
- Performance of treatability studies (if required)
- Interim measures design and implementation, and development of a construction quality assurance plan and a performance standards verification plan
- Completion of the interim measures report

These elements are the key steps for evaluating interim measures and selecting an alternative; once selected, design can proceed, followed by implementation. The final section of this POA presents the schedule for interim measures at the Cedar facility.

Throughout this document, interim measures program requirements will be discussed with respect to existing guidance (*RCRA Corrective Action Interim Measures Guidance* EPA/530-SW-88-029, and the *RCRA Corrective Action Plan* EPA/530-SW-88-028), and proposed rules for corrective actions at Sites (proposed Subpart S, 40 CFR 264.500 through 264.552). The proposed rules provide guidance for remedy selection under the corrective action process.

2.0 INTERIM MEASURES WORK PLAN — GROUNDWATER

The initial step in conducting interim measures for the 1,2-dichloroethane plume beneath the Cedar facility is to prepare an Interim Measures Work Plan (IMWP), that outlines the following elements:

- Relevant site information and site assumptions
- Interim measures objectives and facility-specific remedial goals
- Proposed interim measures alternatives and evaluation methodology

2.1 Background

The groundwater interim measures study will focus on the 1,2-dichloroethane plume, which is above its maximum contaminant level (MCL) of 5 micrograms per liter (μg/L) beyond the site's property boundary. As discussed in previous documents (e.g., the *Facility Investigation Report*, EnSafe 1996), advective groundwater transport is represented by average groundwater velocities, which may range from 100 to 300 feet per year (ft/yr). 1,2-Dichloroethane contamination has been quantified in offsite wells over 3,500 feet (0.7 miles) downgradient of the site. Offsite groundwater is not used for domestic purposes; irrigation is the primary use of the alluvial aquifer in the vicinity of the Cedar facility. Since domestic and municipal water supplies are typically obtained from the Sparta Sand/Memphis Sand aquifer system, the plume is not expected to threaten the primary drinking water aquifer in the area.

2.2 Relevant Site Information and Site Assumptions

Relevant site information will be discussed in the IMWP. Critical to the IMWP evaluation will be the extent of 1,2-dichloroethane contamination, as well as the nature and extent of other site contaminants which should be considered during the interim measures evaluation (e.g., the impact of dinoseb on an onsite containment system). The composition of groundwater addressed by any active remedial system (and the likelihood of accelerating migration of "stationary" contaminants like dinoseb) will factor into the alternatives evaluation.

In addition, given the highly transmissive nature of the aquifer, site-specific and regional aquifer data will be discussed to document both the extent of available data and any assumptions required to complete the interim measures study. If necessary, aquifer tests may be recommended to characterize hydraulic parameter variation with depth. Aquifer characteristics that impact the fate and transport of 1,2-dichloroethane will be also evaluated, given the presence of contaminants exceeding MCLs beyond the property boundary.

Discussion of relevant site information is important to the interim measures process because, due to the magnitude of groundwater contamination and the extreme hydraulic properties within the impacted aquifer, active interim measures are expected to be technically complex and extremely costly.

2.3 Interim Measures Objectives and Remedial Goals

The IMWP will outline specific interim measures objectives; these objectives will be based on protection of human health and the environment. The IMWP will develop site-specific goals in context of the existing and likely future groundwater use scenario. If possible, site-specific goals will consider the natural attenuation mechanisms currently underway within the aquifer, in order to reflect nationwide groundwater management strategies. The goal-development portion of the IMWP may include (but is not limited to): risk evaluations for both human and ecological receptors, a preliminary attenuation screening, and groundwater modeling to evaluate attenuation parameters. Goals will then be used during the IME to evaluate the effectiveness of each alternative. Verification of the remedial goals will be confirmed through compliance monitoring of downgradient monitoring points.

2.4 Proposed Interim Measures and Evaluation Criteria

Interim measures guidance specifies that the remedial action should be evaluated and designed based on site characteristics, waste characteristics, and technology limitations. The guidance does not

provide more detailed evaluation criteria to define and distinguish between various remedial options. A general range of interim measures, as identified in guidance, includes:

- Delineation/verification of gross contamination
- Sampling and analysis
- Interceptor-trenches or collection systems
- Pump-and-treat or in situ treatment
- Temporary caps or covers

In the case of a small plume or a simple hydrogeologic regime, the interim measures criteria may be sufficient to determine if the proposed remedies are adequate for the site. However, because of the magnitude of 1,2-dichloroethane contamination and the extreme hydraulic characteristics of the aquifer, a detailed technical evaluation of several potential interim actions will be necessary to determine if the interim measure can comply with long-term CMS site goals.

Proposed rules for corrective actions (Proposed Rule 264.522, 55 FR 145, July 27, 1990) suggest that the remedy selection process should consider the following factors:

- The performance, reliability, ease of implementation, and potential impacts of the remedy, including safety impacts, cross media impacts, and control of exposure to any residual contamination.

- The effectiveness of potential remedies in achieving adequate control of sources and cleanup of the hazardous waste (including hazardous constituents) released from solid waste management units.

- The time required to begin and complete the remedy.

- The costs of remedy implementation.

- Institutional requirements, such as state or local permit requirements, or other environmental or public heath requirements which may substantially affect remedy implementation.

Therefore, to ensure adequate evaluation of groundwater interim measures, the IMWP will identify several technologies or process options which will be considered during the IME. A screening-level discussion will be provided for each technology/option to illustrate its applicability to the site. Detailed analysis of the proposed alternatives will be performed during the IME, and each factor listed above will be considered in developing these alternatives. These factors should provide sufficient technical basis for evaluating short- and long-term feasibility, and to ensure compatibility with final CMS goals.

2.5 Groundwater IMWP Schedule

The groundwater IMWP will be implemented according to the proposed schedule. The schedule is presented in Section 9.

Significant effort will be expended during the development of the IMWP, as several elements of the CMS process will be incorporated into the work plan. Specifically, remedial goals and preliminary screening of technology/process options will be presented in accordance with the proposed rule on CMS plans (Proposed Rule 264.523, 55 FR 145, July 27, 1990). Elaboration of objectives and possible approaches within the work plan is expected to facilitate final review and approval of the interim measure(s) selected for the Cedar facility.

3.0 DEVELOPMENT OF A GROUNDWATER MONITORING PLAN

A GMP will be developed to evaluate changes in contaminant concentrations within the alluvial aquifer, both on- and offsite. The groundwater monitoring plan will address the following elements:

- Wells to be monitored
- Analytical suite
- Monitoring frequency

3.1 Monitoring Wells

The GMP will identify wells along the perimeter of the contaminant plumes, as well as select interior wells, which will be used to monitor both contaminant migration and degradation. Wells will be identified based on historical analytical data.

3.2 Analytical Suite

The analytical suite for the interim monitoring program will be proposed based on contaminant patterns and changes over the past four years of monitoring. Where possible, the analytical suite will be streamlined to focus on key parameters that pose the highest potential for offsite migration.

3.3 Monitoring Frequency

The monitoring frequency will be proposed based on an evaluation of historical data.

3.4 GMP Schedule

The schedule for the GMP is discussed in Section 9. Once ADPC&E approves the GMP, groundwater monitoring will be implemented according to the schedule outlined in the plan. Sampling and reporting procedures will be performed as described in the final, approved plan.

4.0 INTERIM MEASURES WORK PLAN — SITE 5

The work plan addressing the drum vault at Site 5 is expected to include the same components as the groundwater IMWP:

- Relevant site information and site assumptions
- Interim measures objectives and facility-specific remedial goals
- Proposed interim measures and evaluation criteria

4.1 Background

ADPC&E has determined that the drum vault at Site 5 presents an imminent hazard to human health and the environment. FI results indicated that contamination at Site 5 was likely attributable to residual contamination at Site 9, not to drums stored in the vault. However, because the contents of the drums are unknown, and because the design of the drum vault is unknown (i.e., flooring material/competency), ADPC&E has mandated interim measures for this Site.

Because the building overlying Site 5 is an active manufacturing facility, interim measures addressing the drum vault may impact operations at the Cedar plant. The IMWP for Site 5 has been deferred until 1999 to allow Cedar time to evaluate current operations and to determine logistical support requirements if manufacturing will be impacted.

4.2 Relevant Site Information

The IMWP for Site 5 will present relevant site information, as well as any assumptions required to complete the interim measures study. The IMWP will also identify any task required to supplement the IME; these tasks may include but are not limited to inspection of the warehouse above the drum vault to determine structural integrity, or excavation of the drum vault foundation to determine flooring and/or collect samples. Plans and historical documents will be reviewed to develop the IMWP and facilitate interim measures.

4.3 Interim Measures Objectives and Remedial Goals

The IMWP will outline specific interim measures objectives which will be based on protection of human health and the environment. The IMWP will develop remedial goals in context of current and likely future site use. Objectives will be compatible with the physical and chemical hazards presented by the drum vault area.

The goal-development portion of the IMWP may include (but is not limited to): assessing potential leaching to groundwater, and determining whether a release is ongoing

Goals will then be used during the IME to evaluate the effectiveness of each alternative. Verification of these remedial goals will be confirmed through compliance monitoring of downgradient monitoring points.

4.4 Proposed Interim Measures and Evaluation Criteria

Potential interim measures will be assembled following data review. A screening-level discussion will be provided for each technology/option to illustrate its applicability to the site. Detailed analysis of the proposed alternatives will be performed during the IME; the factors discussed in Section 2.4 will be used to evaluate each alternative. As with groundwater interim measures, more rigorous standards will be applied to the IME process because remedial decisions may have significant impact on Cedar's manufacturing process (e.g., interruption of operations, building demolition, etc.). The CMS-level screening will identify measures incompatible with the final CMS site remedy.

4.5 Site 5 IMWP Schedule

The Site 5 IMWP will be implemented according to the schedule proposed in Section 9.

Significant effort will be expended during the development of the IMWP, as several elements of the CMS process will be incorporated into the work plan. Specifically, remedial goals and preliminary

screening of technology/process options will be presented in accordance with the proposed rule on CMS plans (Proposed Rule 264.523, 55 FR 145, July 27, 1990). Elaboration of objectives and possible approaches within the work plan is expected to facilitate final review and approval of the interim measure(s) selected for the Cedar facility.

5.0 INTERIM MEASURES EVALUATIONS

Separate IMEs will be performed for groundwater and Site 5, but the general components for both are described below.

5.1 Interim Measures Development/Conceptual Design

Each interim measure recommended in the IMWP will be developed with respect to site-specific contaminant concentrations, site geology and hydrogeology, and other elements which may impact the feasibility of the technology or process option. A conceptual design for the alternative will be developed, including:

- the area to be addressed
- the size and configuration of treatment or containment systems (if any)
- the interim measure time frame
- flow rates or treatment times
- spatial requirements for the proposed option and disposal logistics (if any)
- permitting requirements
- integration with the final CMS

Once the conceptual design is presented, each alternative will be discussed in terms of its performance, reliability, and ease of implementation. Effectiveness will be gauged in terms of each alternative's ability to meet site-specific goals. Disadvantages and potential impacts of the remedy will be considered for each option as well, including safety impacts, cross-media impacts, and control of exposure to any residual contamination.

5.2 Remedy Standards Evaluation

Following the development of each alternative, the interim measures evaluation will be performed. To ensure compatibility with the final CMS, the four primary standards for remedies specified in CMS guidance will be used for evaluation:

- protection of human health and the environment
- attainment of media cleanup standards
- source control to reduce or eliminate further releases
- compliance with waste management standards

These standards must be met in order to meet corrective action program goals. Each alternative will be evaluated using specific definitions for each standard, as presented in *RCRA Corrective Action Plan* guidance.

5.3 Remedy Selection Criteria

The evaluation will be completed using five remedy selection criteria to weigh the advantages and disadvantages of each alternative. These criteria include:

- long-term reliability and effectiveness
- reduction of toxicity, mobility, or volume
- short-term effectiveness
- implementability
- cost

These criteria represent a combination of technical measures and management controls. Discussion of each alternative in terms of the remedy selection criteria permits differentiation among the alternatives, and facilitates comparison of critical elements.

5.4 Comparative Analysis and Interim Measures Selection

Following the detailed evaluation of the alternatives, a comparative analysis will be performed to highlight the differences among them. The comparative analysis usually helps determine which option best addresses short- and long-term site goals as well as measuring cost-effectiveness.

The interim measure that best meets program goals and long-term CMS management objectives will be selected and recommended for implementation. The IME will also identify additional data needs, if any. If treatability studies are required to complete the design of the proposed interim measure, the scope and objectives of the study will be outlined. If the IME indicates that two or more alternatives may be viable but data are insufficient to determine which option best meets site goals and objectives, treatability studies may also be required to refine the alternatives and thus provide sufficient data to complete the evaluation.

5.5 IME Schedule

The IME schedule for both groundwater and Site 5 reports is presented in Section 9.

6.0 PERFORMANCE OF TREATABILITY STUDIES

Treatability studies are typically performed in order to:

- Determine if a treatment technology is viable under site-specific conditions.
- Reduce cost and performance uncertainties so that a technology can be evaluated and selected.
- Support the full-scale remedial design of a specific alternative.

6.1 Determining the Need for Treatability Studies

Where literature and vendor information are sufficient to determine the effectiveness of a specific technology under specific conditions, treatability studies are not warranted for interim measures or corrective measures studies, and may be postponed until remedial design (if required at all). For example, air stripping is a common ex situ treatment technology for volatile organics, including 1,2-dichloroethane. Treatability studies will likely not be required to demonstrate the effectiveness (i.e., the removal efficiency) of specific air stripping units — vendor models and information will likely be adequate to complete the design. However, treatability work may be required during the design process to determine optimal pretreatment configuration and operating requirements for inorganics removal, and to ensure that air stripper removal efficiencies are maintained over the long term.

Treatability studies may also be required to determine the effectiveness and treatment requirements for newer, in situ technologies if the IME determines that in situ treatment is viable at the Cedar facility. While vendor information and case studies from other sites may document a technology's applicability to a particular contaminant, it is critical to determine whether the technology can achieve the final remedial goals under site-specific conditions (e.g., contaminant concentrations, soil

type, hydrogeology, etc.). The need for detailed treatability data may not become apparent until after initial screening or alternative development has occurred. If the IME indicates that treatability work is required to determine the appropriate alternative for interim measures, studies will be conducted.

6.2 Treatability Study Scoping

If a treatability study is required, an initial determination as to whether bench-scale studies, pilot-scale studies, or both are required to evaluate the technology. A scope will be developed that focuses on specific objectives (for example, will the study address overall feasibility of a particular technology, or will it develop specific design parameters) and outlines the schedule for each study.

The scope may include, but will not be limited to:

- technology description
- test objectives
- test startup requirements (location, test area required, etc.)
- specialized equipment or materials required (proprietary chemicals, heavy equipment, etc.)
- experimental procedures/operating conditions
- test parameters, variables, and duration
- sampling plan and associated analytical methods
- data management procedures
- health and safety concerns
- residuals management

The scope will be submitted to the ADPC&E for concurrence.

6.3 Treatability Study Implementation

The treatability study will be implemented using the scope, outlined above, and appropriate RCRA and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) guidance.

6.4 Report and Recommendations

A treatability study report will be prepared at the end of the study and following data analysis. The report will include the following elements:

- test narrative
- data analysis and interpretation
- conclusions and recommendations
- scale-up requirements for application to full scale

The nature of the conclusions presented in the report (e.g., determination of feasibility or operating parameters) will vary according to the objectives defined in Section 6.2 above.

7.0 INTERIM MEASURES DESIGN AND IMPLEMENTATION

Once an interim measure has been selected, design plans and specifications will be developed and implemented. Other plans that may be required before implementation include:

- operations and maintenance (O&M) plans
- construction quality assurance (CQA) plan
- performance standard verification (PSV) plan

The interim measure will be implemented once ADPC&E has approved the design and O&M, CQA, and PSV plans.

7.1 Plans and Specifications

An implementation plan, design drawings, and specifications will be developed for the interim remedy. The contents of these documents may include, but are not limited to, the following:

- A discussion of the design strategy and design basis, including compliance with all applicable or relevant environmental and public health standards, and minimization of environmental and public impacts.

- A discussion of technical factors, including use of currently accepted environmental control measures and technology, constructability, and use of currently acceptable construction practices and techniques.

- A description of assumptions made and detailed justification for these assumptions.

- A discussion of the possible sources of error and references to possible operation and maintenance problems.

- Detailed drawings of the proposed design, including qualitative and quantitative flow sheets, facility layout, and utility locations.

- Tables listing materials, equipment, and specifications.

- Tables giving material balances.

- Appendices including sample calculations, derivation of equations (if any), and results of laboratory or field tests.

The plans, drawings, and technical specifications shall be correlated and cross-checked to ensure consistency, as required by interim measure guidance. The plans and specifications will be accompanied by an implementation schedule.

Cedar Chemical will submit 30%, 90%, and 100% design deliverables to ADPC&E during the interim measures process. The 100% (final) design deliverable will be sufficient to include in a bid package and invite contractors to submit bids for the construction process.

7.2 O&M Plan

If O&M is required, a plan will be submitted to document the operation and long-term maintenance of the system. The plan shall include the following:

- Equipment startup and operator training

- Description of normal O&M

- Description of routine monitoring and laboratory testing to ensure system operation and efficiency

- Description of equipment

- Records and reporting mechanisms required

The O&M plan will be submitted with the 90% and the final (100%) design deliverable.

7.3 CQA Plan

A CQA plan may be required if the interim measure will require certification that completion meets or exceeds all design criteria, plans, and specifications. Although the nature and detail of the CQA plan will depend on the interim measure selected, the following elements should be included:

- CQA objectives, including responsibility and authority, personnel qualifications, inspection activities, sampling requirements, and documentation.

- Inspection activities, including preconstruction inspection and meeting, prefinal inspection, and final inspection of remedy construction.

- Sampling requirements, including sampling and testing activities, sample size, sample and test locations, frequency of testing, acceptance and rejection criteria, and plans for correcting problems.

- Documentation requirements, including inspection reports, problem identification and correction reports, design acceptance reports, final documentation, and records storage.

The CQA plan will be submitted with the 90% and the final (100%) design deliverable.

7.4 PSV Plan

A PSV plan will be prepared to document the effectiveness of the remedy with respect to long-term site objectives. Elements of the PSV plan may include (but are not limited to) the following:

- Identification of site objectives and remedy evaluation metrics
- Sampling frequencies, sampling requirements, analytical methods, and corresponding data quality objectives
- Data evaluation procedures, including statistical methods (if any)
- Data management procedures
- Reporting procedures

The PSV plan will be submitted with the 90% and the final (100%) design deliverable.

7.5 Implementation

Upon approval of the final design and associated O&M, CQA, and PSV plans, interim measures will be implemented according to the schedule outlined in the design package.

8.0 INTERIM MEASURES IMPLEMENTATION REPORT

A report will be prepared after the implementation phase of interim measures is complete. The implementation report will document that the project is consistent with design specifications and that the interim measures are performing adequately. The report may include, but is not limited to, the following elements:

- Synopsis of the interim measures and certification of the design and construction (including as-builts and design engineers' acceptance reports).

- Explanation of any modifications to the plans and why these were necessary for the project (including inspection data, problem identification and corrective action reports, block evaluation reports, photographic reporting data sheets, and written justification of all deviations from design and material specifications).

- List of criteria, established before the interim measures were initiated, for judging the functioning of the interim measures, and explaining any modification to these criteria.

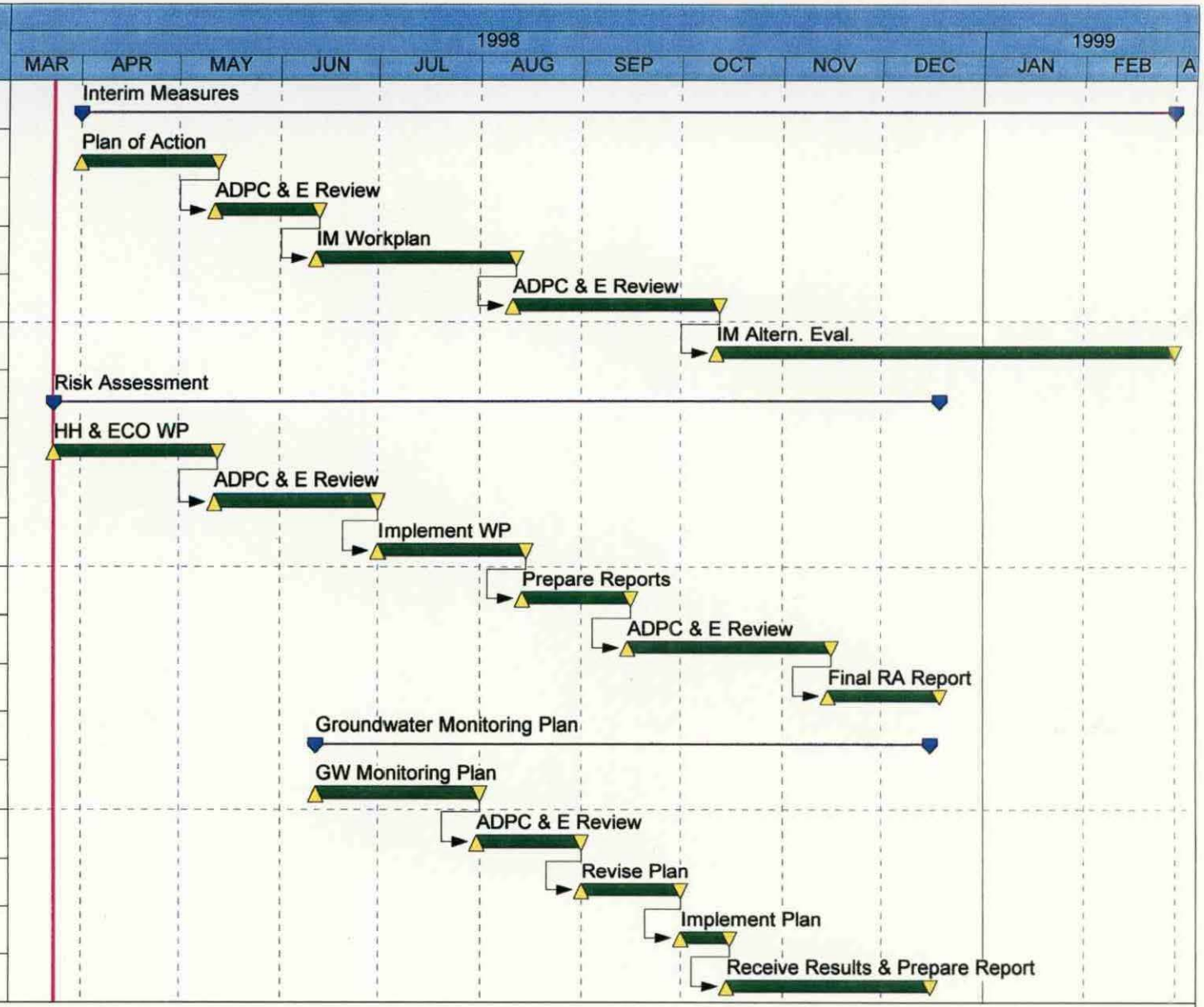
- Results of facility monitoring, indicating that the interim measures will meet or exceed the performance criteria (e.g., a summary of the PSV plan).

- Explanation of the O&M to be undertaken at the facility (e.g., a summary of the O&M plan).

9.0 SCHEDULE

The interim measures schedule is shown on the next page. This schedule also shows the proposed timeline for Cedar's human health and ecological risk assessments; the human health and ecological risk assessment work plan is being submitted concurrently with this POA. CMS work plans will be developed and submitted after the risk assessments are completed and the final risk assessment reports are approved by ADPC&E.

Outline Code	Early Start	Early Finish
1	**01APR98**	**28FEB99**
1.1	01APR98 *	12MAY98
1.2	12MAY98	12JUN98
1.3	12JUN98	11AUG98
1.4	11AUG98	12OCT98
1.5	12OCT98	28FEB99
2	**24MAR98**	**18DEC98**
2.1	24MAR98 *	12MAY98
2.2	12MAY98	30JUN98
2.3	01JUL98	14AUG98
2.4	14AUG98	15SEP98
2.5	15SEP98	15NOV98
2.6	15NOV98	18DEC98
3	**12JUN98**	**15DEC98**
3.1	12JUN98 *	31JUL98
3.2	31JUL98	31AUG98
3.3	01SEP98	30SEP98
3.4	01OCT98	15OCT98
3.5	15OCT98	15DEC98



Data date	24MAR98
Number/Version	JJB/01 Schedule
Page number	1A

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- Early start point
- Early finish point
- Early bar
- Progress bar
- Critical bar
- Summary bar
- Progress point
- Critical point
- Summary point
- Start milestone point
- Finish milestone point

Cedar Chemical Corp.
Interim Measures Schedule

ENSAFE