

MDSS Functional Prototype Display System Preview – April 2002



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Images shown are valid as of 15 April 2002



MDSS Display System - Overview

The MDSS FP display system has been coded as a Java application. The application will run on a local machine. For the demo, the case data are downloaded with the application.

The display system allows the user to:

- a) View weather information for each user defined forecast point in the State**
- b) Alert users when weather or road conditions are predicted to deteriorate in the future (current default = 48 hrs.)**
- c) View road condition information at each user defined maintenance route**

(continued)

MDSS Display System - Overview

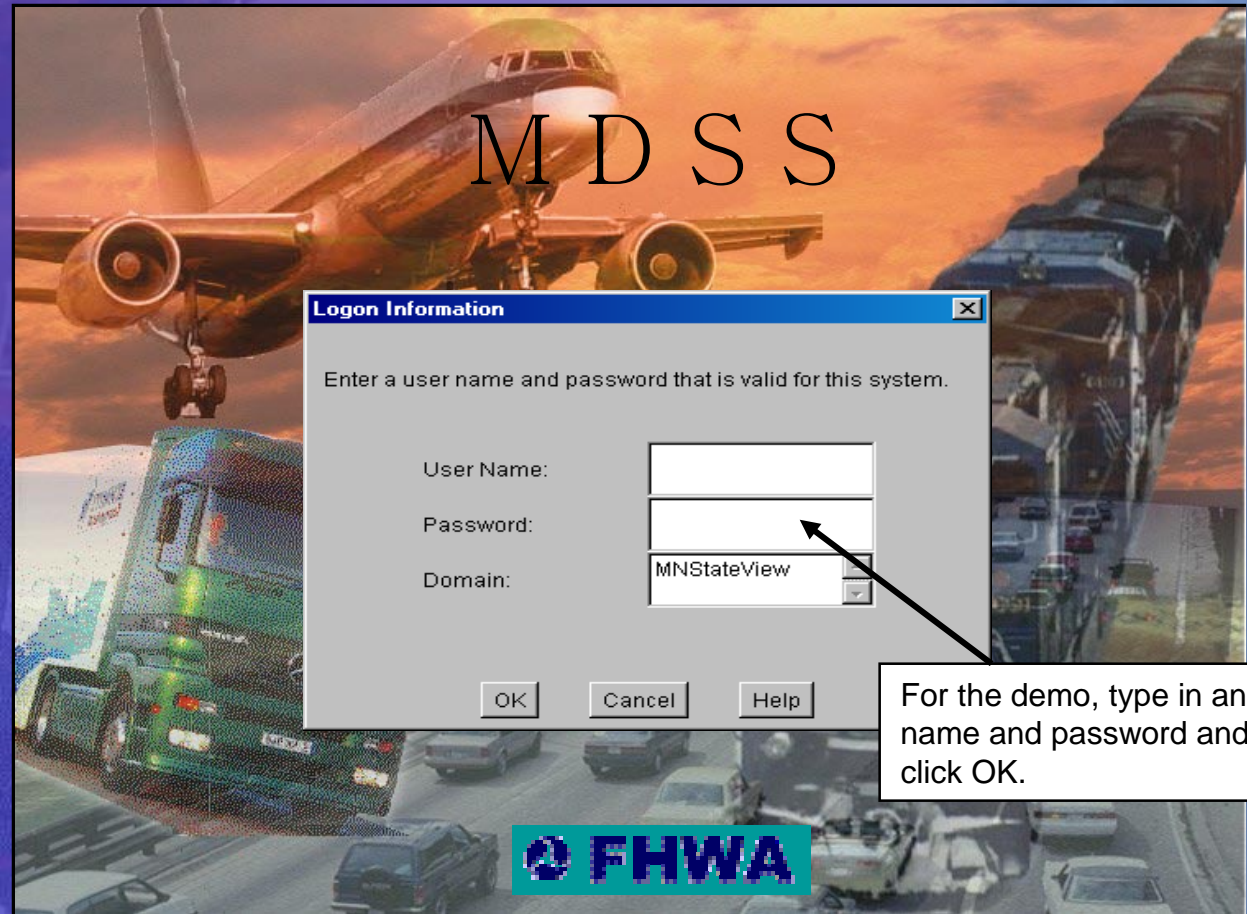
- d) Calculate winter maintenance treatment plans (e.g., chemical use, plowing, timing of treatment, and location) for each route
- e) Review the predicted impact of the recommended treatment plans
- f) Perform *what if* scenarios using user-defined treatments to assess the impact of various user defined treatment plans
- g) Compare treatment plans and shift schedules
- h) Review the depletion of stock supplies for various treatment plans

MDSS Login Page

This page allows the user to login to the MDSS FP.

The system is designed to allow the user to configure the system to pop up the initial view of choice (e.g., State View or Route View) depending on user preferences.

Other user-defined settings could be added in the future.

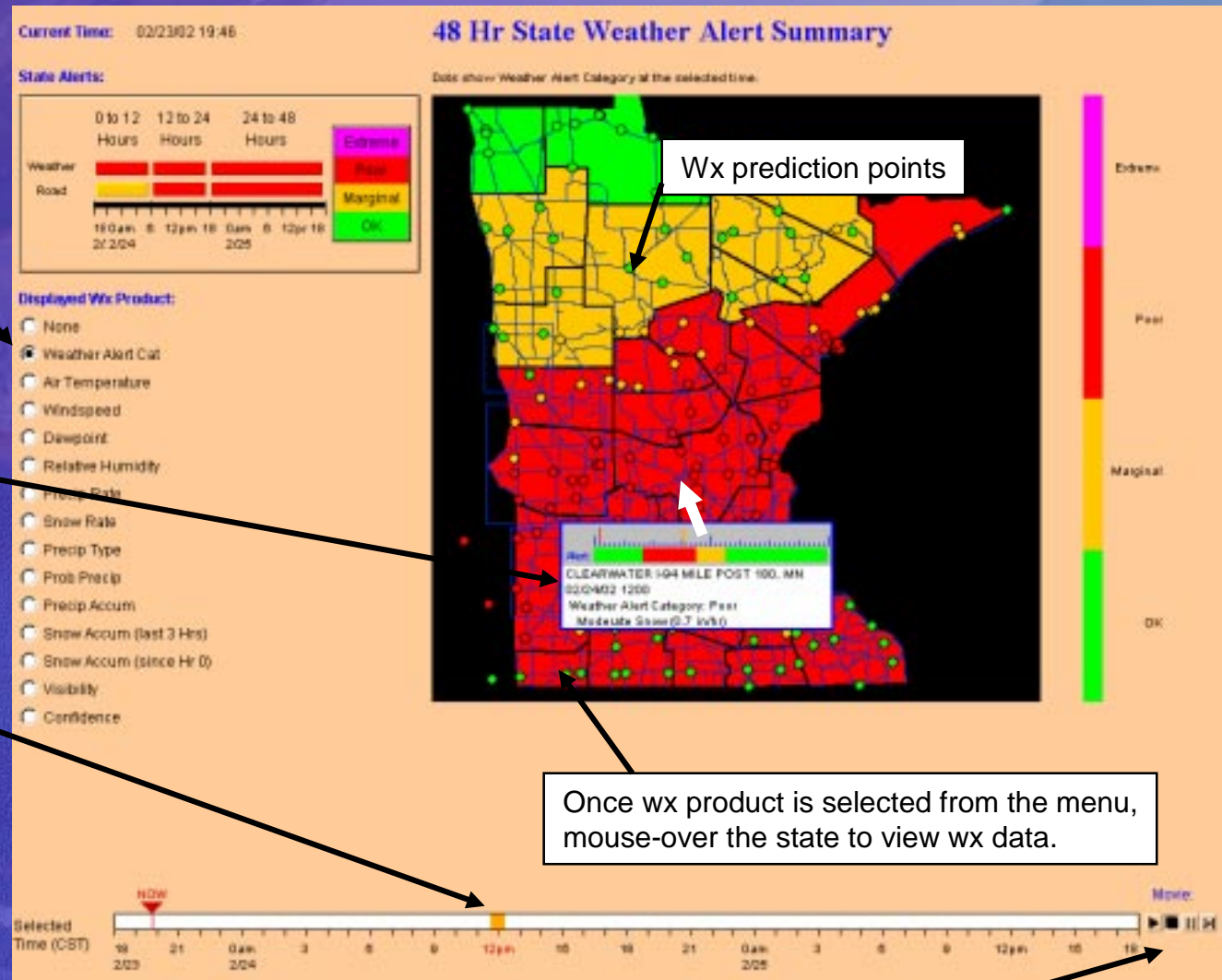


State View: Monitor Wx Conditions

From the *State View* page, the user can select weather (wx) parameters and view the data at points within the State.

The user can also mouse-over any prediction point and see a graphic of the alert category over time and the reason for the alert.

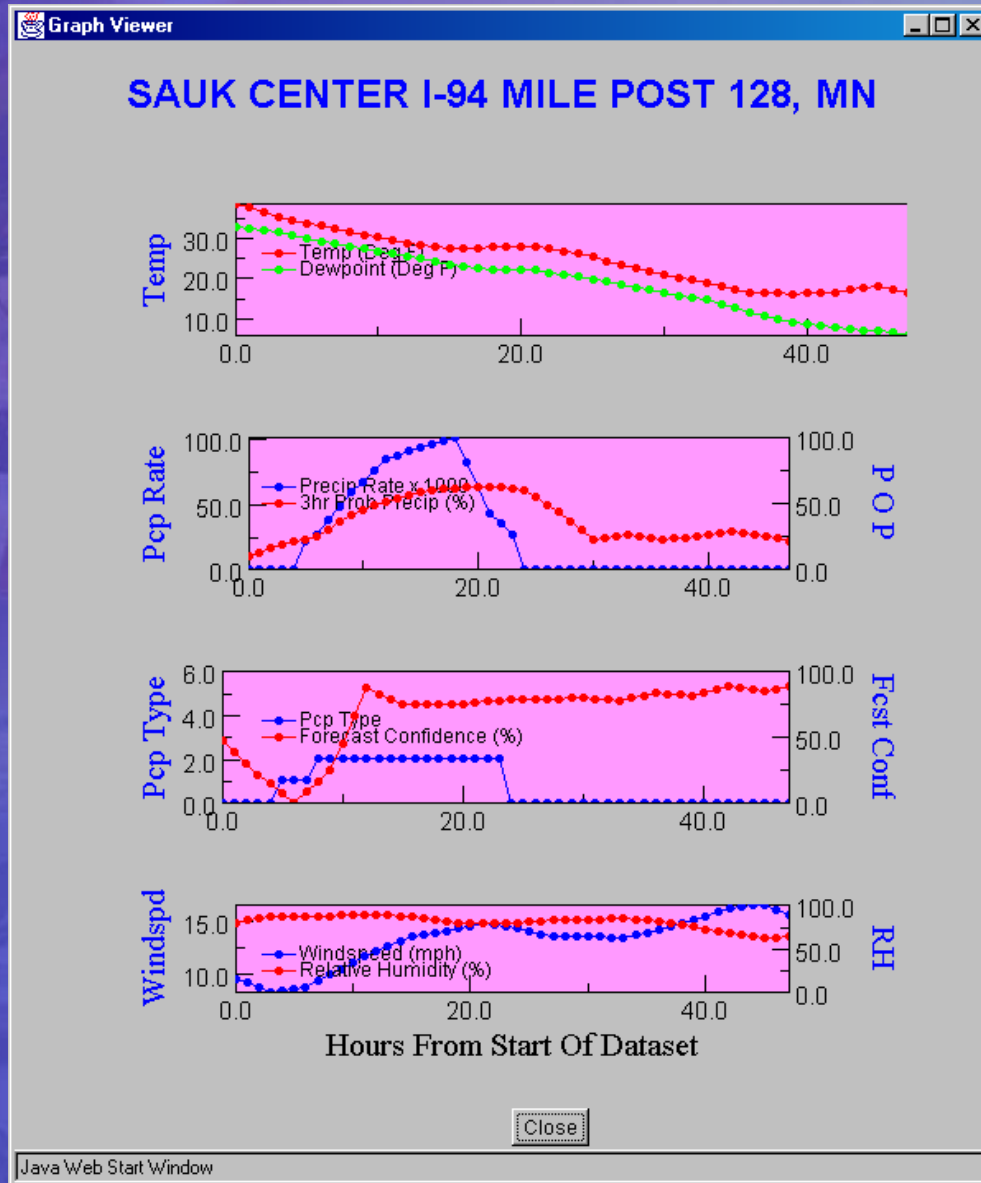
The user can move the cursor along the time bar to see data at different times. The user can animate the graphic to see how the weather changes with time.



Weather Data Time Series Page

The user can also view weather data *Time Series* pages for each weather prediction point by double-clicking on the prediction points.

The time series application shown on the right is temporary and will be upgraded to a more sophisticated capability in early May 2002!

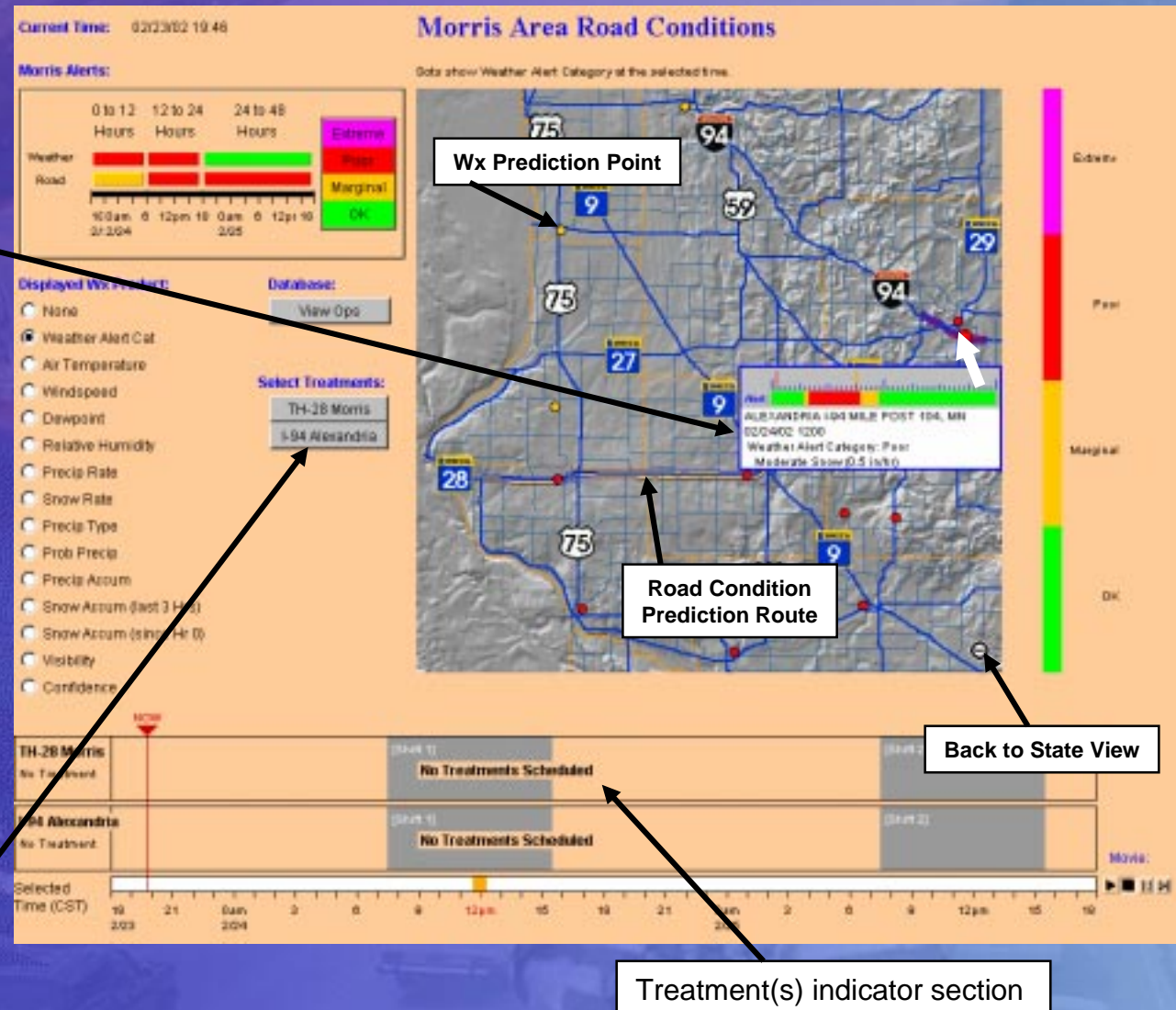


Route View: Monitor Wx and Road Conditions & Select Treatments

The *Route View* page allows the user to see weather and road condition prediction information. A mouse-over on the route or wx prediction points allows the user to view the alert category and information related to treatment plans.

In this example, the Morris domain was selected. Two routes are included in this view.

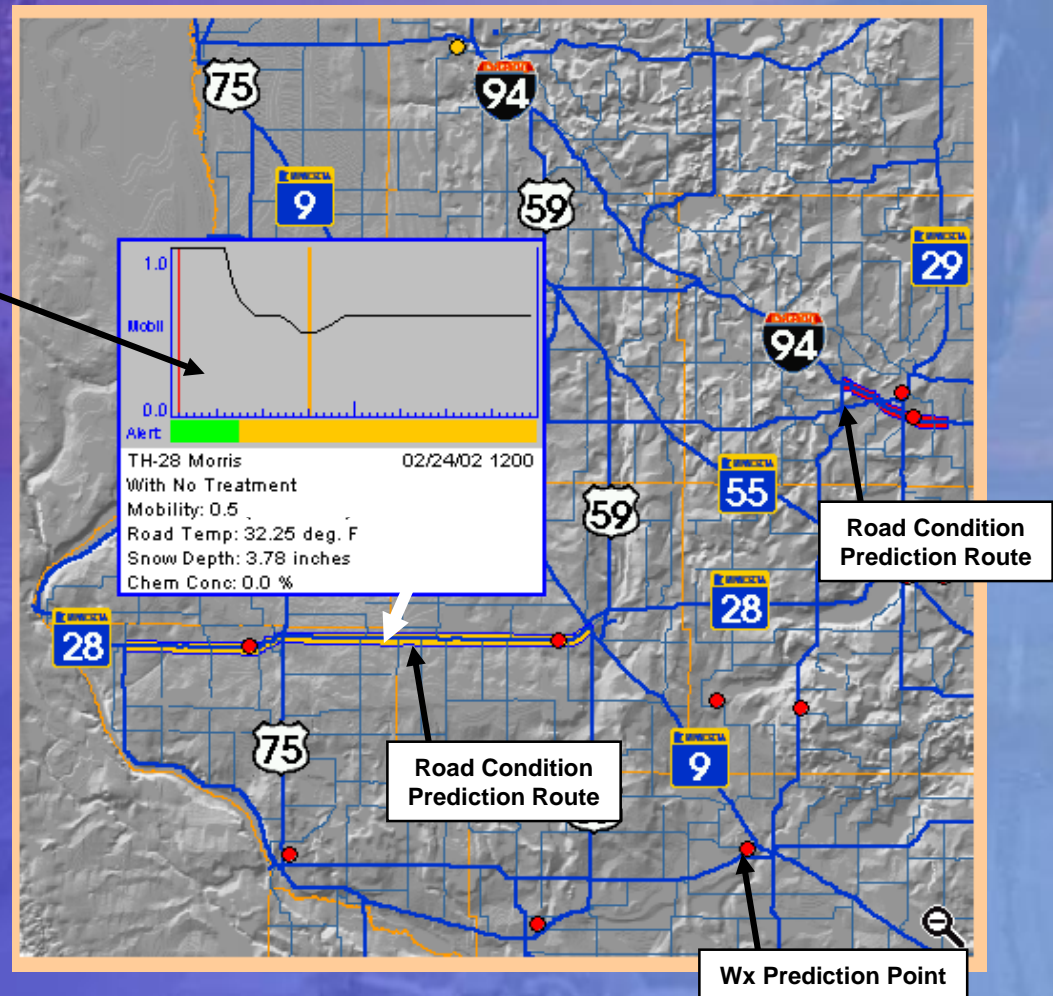
From this page, treatment plans can be generated by clicking on the “Select Treatments” button.



Route View: Road Condition and Treatment Planning

A mouse-over of the route shows the road conditions (e.g., mobility) if no treatment was performed.

In this example, with no treatment, ~3.8 inches of snow would accumulate and because there was no treatment, the chemical concentration at 1200 CST on February 24th is predicted to be zero and mobility decreases to 0.5 (where 1.0 is a dry road).



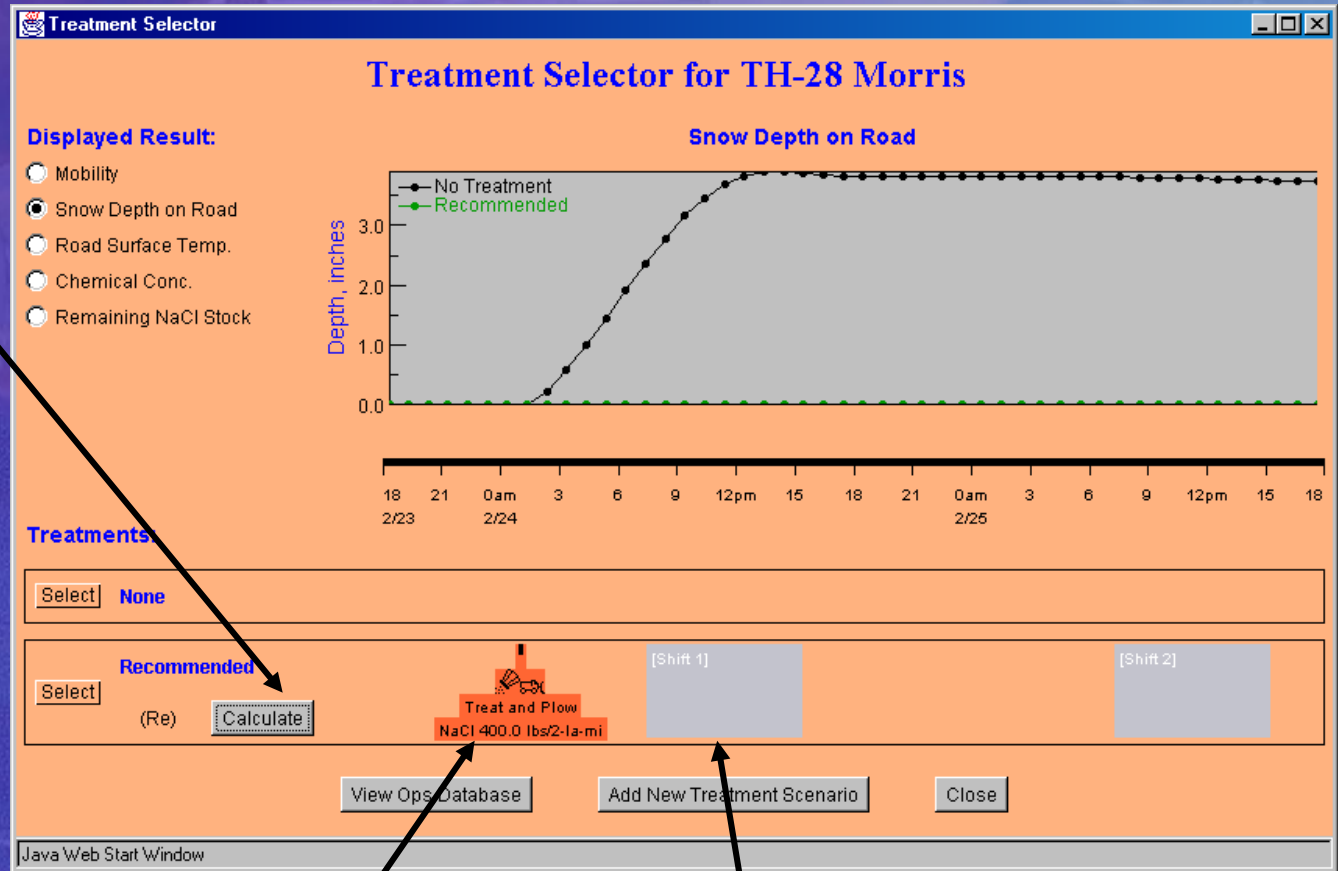
Treatment Selector Page

The *Treatment Selector Page* for the TH-28 Morris route has been selected.

The user asked for the “recommended treatment” to be calculated.

The recommended treatment indicated the NaCl should be applied at 1 am at a rate of 400 lbs per 2-lane mile.

The time series graphic shows the snow depth results of no treatment and the recommended treatment. If the recommended treatment is performed, no snow accumulates on the road.



Chemical amounts could also be presented in other units (e.g., yards/lane mile)

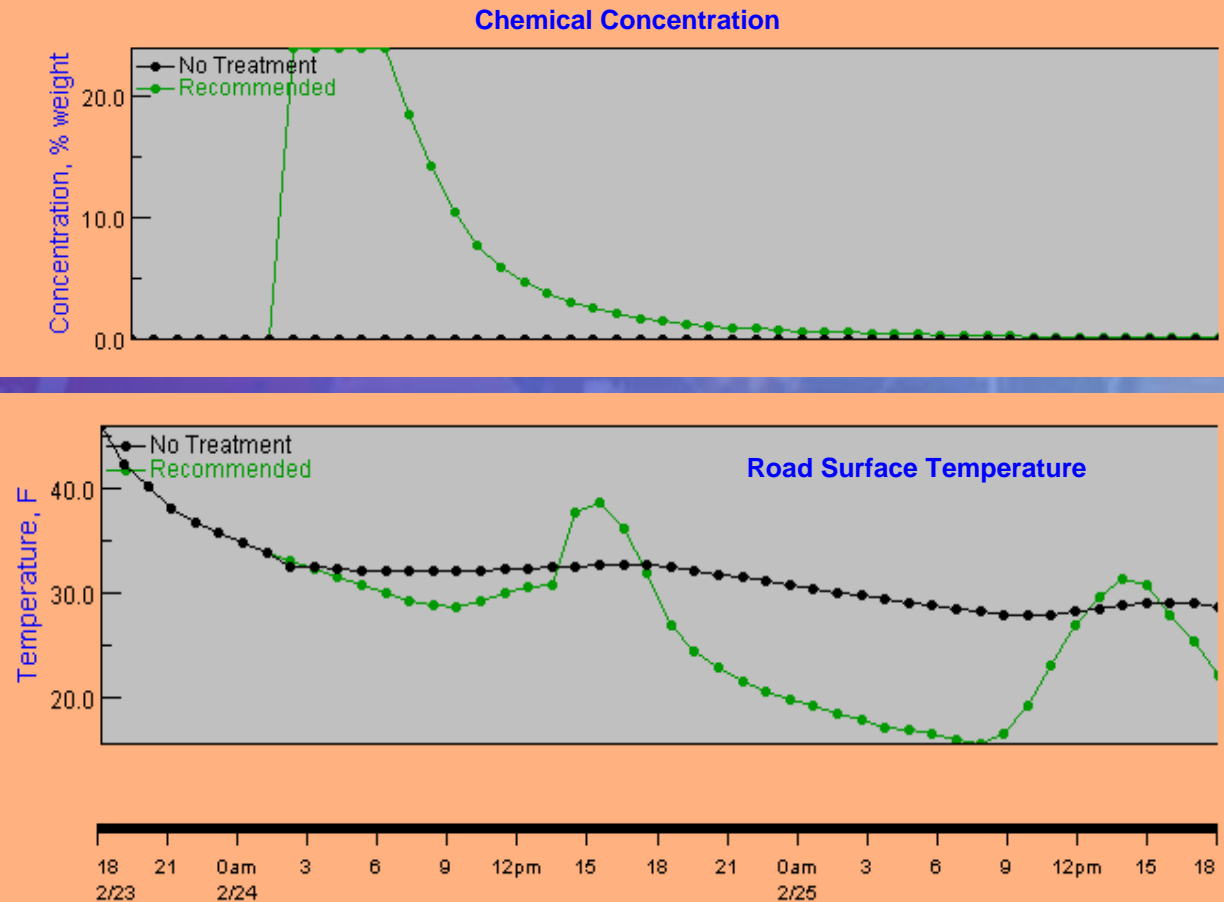
Shift indicator

Treatment Selector Page

From the *Treatment Selector Page*, the user can view other parameters for each selected treatment.

The example shows the road temperature and chemical concentration 48-hr time series with and without the recommended treatment.

Treatment Selector for TH-28 Morris

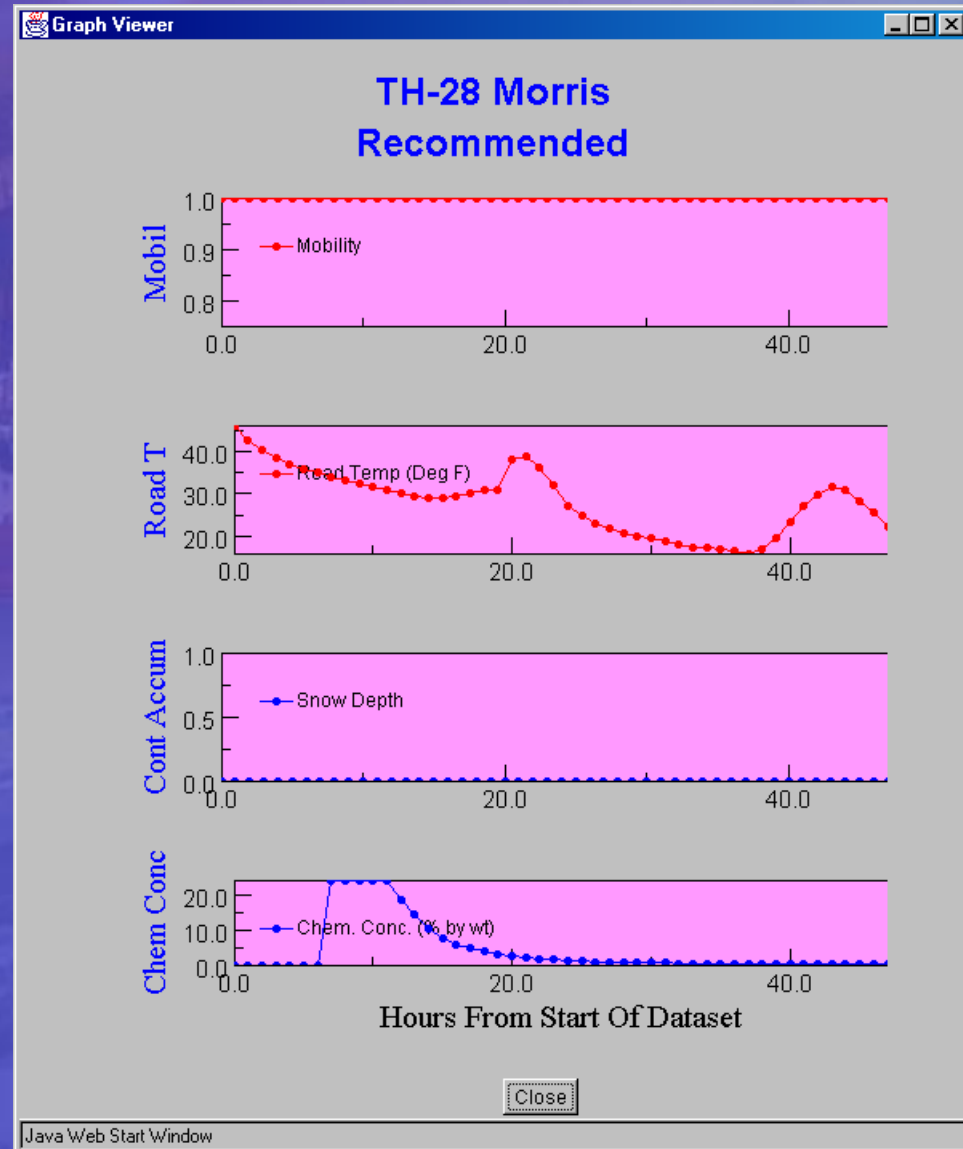


Road Condition Time Series Page

The user can also view road condition *Time Series* pages for each active route and assess the impact of various treatment options.

Double clicking on any active route will pop-up a road condition time-series page. This example shows the time series data for TH-28 Morris if the *Recommended Treatment* were selected.

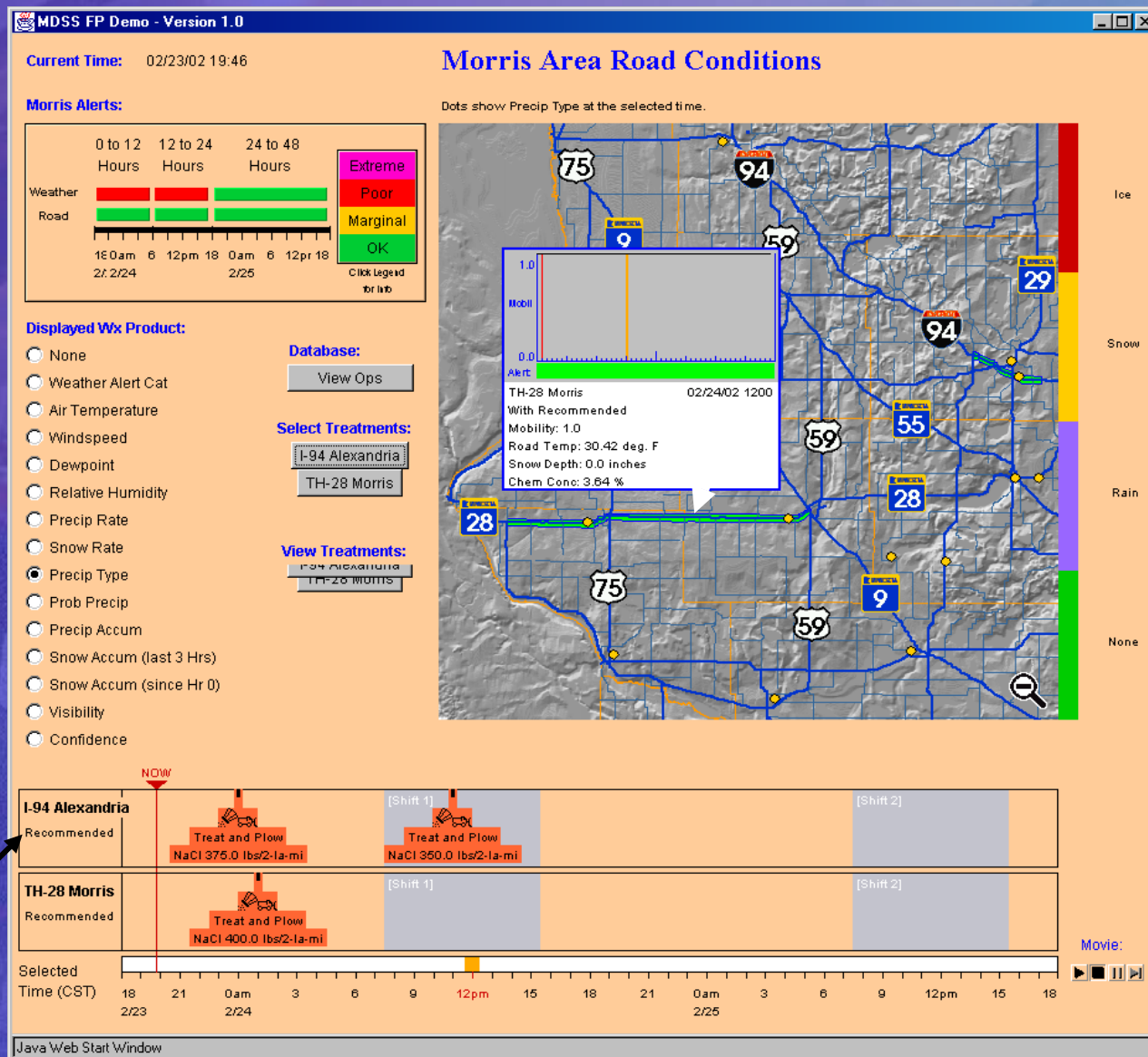
The time series application shown on the right is temporary and will be upgraded to a more sophisticated capability in early May 2002!



Route View: Treatment Planning

Once treatment options are selected, the user can view the results via the *Time Series* pages or *Route Page* via mouse-over. In this example, the user can see that at 12 pm on TH-28, the chemical concentration is predicted to be 3.6% and the snow depth on the road will be zero indicating that the recommended treatment plan (NaCl @ 400 lbs per 2 lane mile at 1 am) is predicted to melt the snow.

Two treatments are recommended for I-94 near Alexandria.



Treatment Planning: Defining Alternatives

From the *Define Treatment Scenario* page, the user can edit or add their own treatment plan. The results can be viewed on the time series windows.

This allows the user to perform “what if” scenarios for each route to determine the best course of action.

Pre generated alternatives are used in the demo. Select *OK* to view the alternatives.

The screenshot shows a Java Web Start window titled "Select Treatment" for "TH-28 Morris Treatment Scenario: Alternative 1". The window has an orange background and contains the following elements:

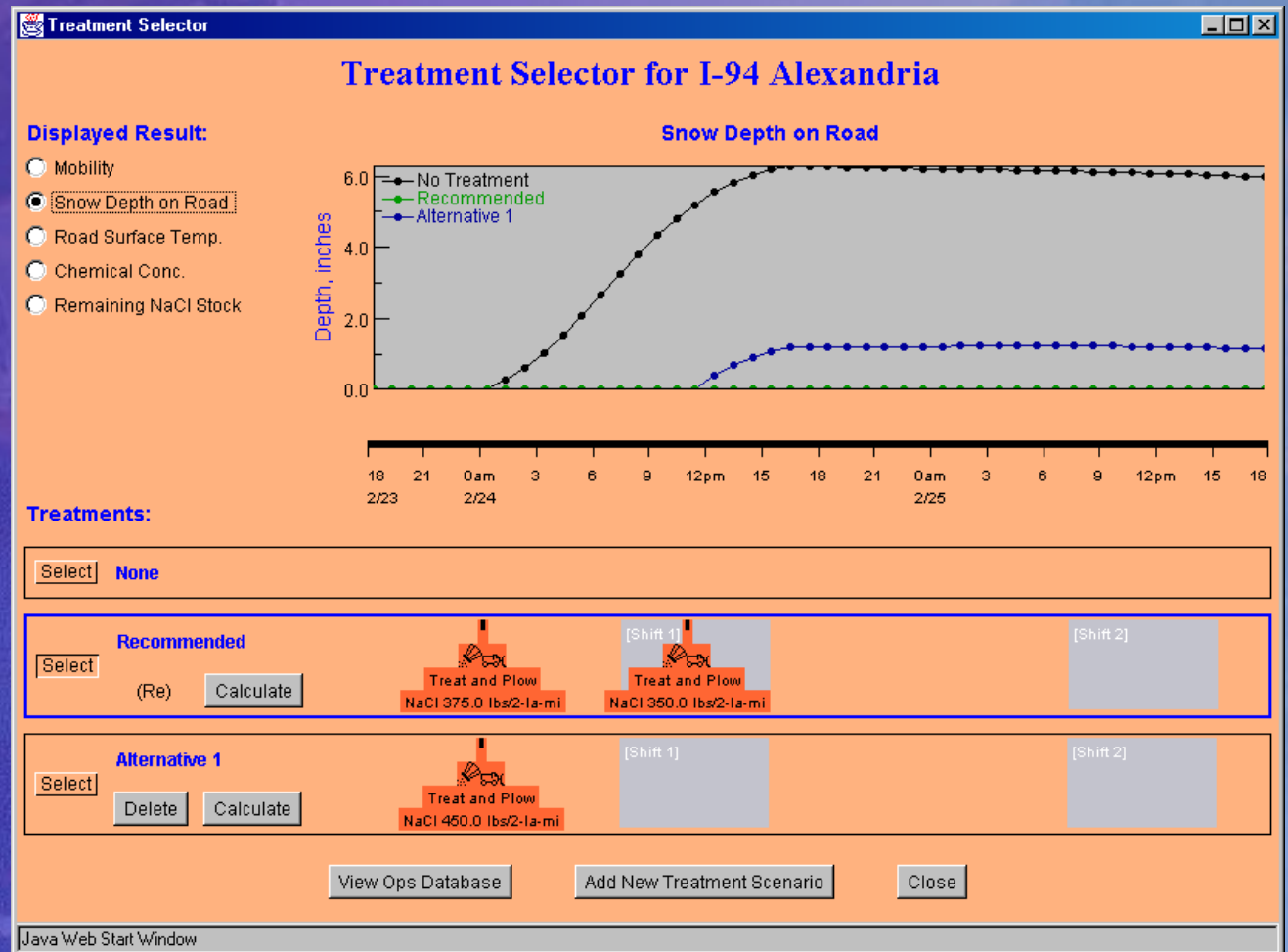
- Select Material:** Radio buttons for "Plow only" (selected), "NaCl", "MgCl", and "Sand".
- Select Amount:** A spinner box set to "25" with the unit "lbs / 2-lane mile".
- Select Start Time:** A time picker set to "00:00" with the unit "Hrs".
- Treatments:** A text area containing the text "02/24/02 0100 CST - Plow and Treat with 300.0 lbs/2-lane-mile of NaCl.".
- Buttons:** "Apply", "OK", and "Cancel" buttons at the bottom right.

An arrow points from the text "Select OK to view the alternatives." to the "OK" button.

Treatment Planning: Viewing Alternatives

Once the user has edited the treatment plan and created their own alternative(s), they can view the results.

In the example, the recommended treatment (red line) of two applications of NaCl will keep the snow off the road (select to view snow depth on road), while the single application of NaCl will fail at noon and snow will accumulate. Other parameters such as chemical concentration can also be viewed for various treatment options.



Database View

The *Database* view allows the user to view the ESS observations for the selected route, input constraints for treatment planning, and input shift information. The user can also select to split shifts.

It also allows the user to view current stocks and how the stocks would be depleted for chosen treatment plans.

This page assumes that an operational version of the MDSS would interface with the DOT operational database to input and export data.

The screenshot displays the 'Minnesota Ops Database' web interface. At the top, it shows the 'Current Time' as 02/23/02 19:46 and the 'Selected Route' as 'I-94 Amanda'. The main content is divided into several sections:

- RWIS Observations:** A table with columns for Site, Precip Type, Precip Rate, Air Temp, Road Temp, Chem Conc, RH, Dewpoint, and Wind Spd. The data for site ALEXANDRIA1-94 MILE POST 104, MN shows: Precip Type: None, Precip Rate: 0.0, Air Temp: 37.1, Road Temp: 40.0, Chem Conc: 0.0, RH: 79.1, Dewpoint: 31.2, Wind Spd: 10.0.
- Verify Conditions:** A table with columns for Site, Snow Depth on Road, Road Temp, and Chem Conc. The data for the same site shows: Snow Depth on Road: 0.0, Road Temp: 40.0, Chem Conc: 0.0.
- Treatment Plans Selected:** A list of two plans for site ALEXANDRIA1-94 MILE POST 104, MN: '02/24/02 09:00 CST - Plow and Treat with NaCl at 375.0 lbs/2-lane mile' and '02/24/02 11:00 CST - Plow and Treat with NaCl at 350.0 lbs/2-lane mile'.
- Actual Treatments Performed:** A list of three treatments for the same site: 'NaCl at 125 lbs / 2-lane mile at 18:00', 'NaCl at 100 lbs / 2-lane mile at 22:30', and 'Sand at 175 lbs / 2-lane mile at 6:00'.
- Treatment Constraints:** A section with three columns: 'Possible Treatments' (with checkboxes for NaCl, MgCl, and Sand), 'Stocks Available' (Actual Amount from MN DOT Database: 50 Tons NaCl, 0 Tons MgCl, 75 Tons Sand), and 'Forecasted Amount After Treatments' (42 Tons NaCl, 0 Tons MgCl, 75 Tons Sand). It also includes 'Minimum Time Between Treatments' (1 Hr), 'Level of Service' (Mobility: 0.4), and 'Blackout Periods' (Start: 07:30, End: 08:30; Start: 16:00, End: 17:30).
- Shifts:** A section for 'Feb 24, 2002 Normal Shift' and 'Feb 25, 2002 Normal Shift'. Each shift has a 'Split Shift' button and time selection controls (Start: 07:30, End: 15:30).

At the bottom, there are 'Apply', 'OK', and 'Cancel' buttons, and a status bar indicating 'Java Web Start Window'.

View Selected Treatments

The *View Selected Treatments* window allows the user to see a simple text version of the chosen treatments for each route. It is envisioned that this information would be printed, sent via email or cell phone to operators for easy reference.

